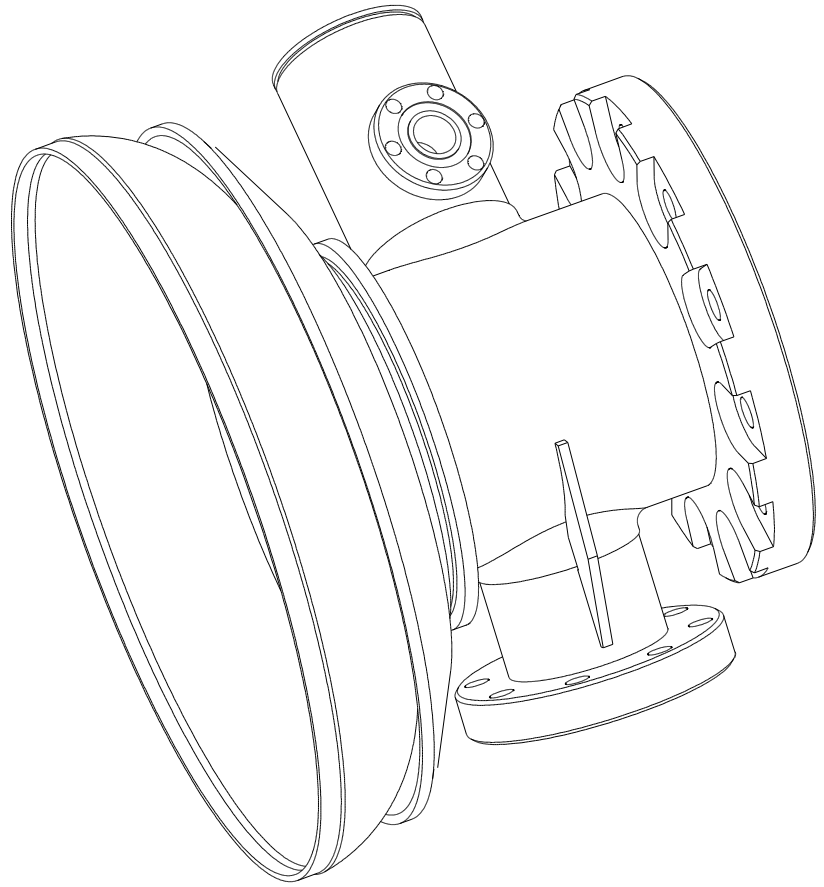


| REV | DESCRIPTION | DRAWN | DATE |
|-----|---|----------|-------------|
| | | APPROVED | DATE |
| A | ADDED EB WELD DEPTH NOTE | E.PIRTLE | 31-JAN-2006 |
| | | M.FOLEY | 31-JAN-2006 |
| | | E.PIRTLE | 05-APR-2006 |
| B | CHANGED LENGTH | M.FOLEY | 06-APR-2006 |
| | | E.PIRTLE | 26-APR-2006 |
| C | ADDED DRAWING IN USED ON IN TITLE BLOCK | M.FOLEY | 26-APR-2006 |



- WELDING NOTES:
- 1) ASSEMBLY TO BE VACUUM TIGHT. NO LEAK SHALL BE DETECTABLE ON THE MOST SENSITIVE SCALE OF A HELIUM MASS SPECTROMETER LEAK DETECTOR WITH A MINIMUM SENSITIVITY OF 2×10^{-10} ATM-CC/SEC FOR HELIUM.
 - 2) ASSEMBLY TO BE CLEANED, AND PACKAGED SO AS TO ASSURE NO CONTAMINATION FROM FOREIGN MATERIALS, METAL CHIPS OR OTHER CONTAMINATES. CLEANING PROCEDURE TO BE APPROVED BY FERMILAB.
 - 3) ALL DESIGN, ASSEMBLY, AND HANDLING IS TO CONFORM TO STANDARD ULTRA HIGH VACUUM PRACTICES
 - 4) ALL ELECTRON BEAM WELDING, ACID ETCHING, CLEANLINESS, AND HANDLING PROCEDURES ARE DETAILED IN DESY SPECIFICATION MHF-SL 1-1999 AND MUST BE FOLLOWED.

- NOTES:
- 1) DIMENSIONS L1 AND L2 ARE DEPENDENT ON A FREQUENCY MEASUREMENT. HALF CELL EQUATOR IS TO BE FINISHED TO FINAL SPECIFICATIONS RELATED TO SAID MEASUREMENT ALLOWING ADDITIONAL MATERIAL FOR WELD SHRINKAGE "S".
 - 2) SEALING SURFACE MUST BE FREE OF SCRATCHES WITH NO RADIAL SCORING. SURFACE MUST BE FREE OF DAMAGES.
 - 3) ADDITIONAL MATERIAL NEEDED FOR CELL TUNING PLUS ALLOWANCE FOR E-BEAM WELD SHRINKAGE. FINAL SURFACE TO BE MACHINED UNTIL TUNED.
 - 4) ALL PARTS ARE TO BE CONCENTRIC WITHIN $\sqrt{0.08}$ mm ALONG DATUM A AND B
 - 5) DO NOT BREAK EDGES ON END CELL
 - 6) DUAL PASS WELD -- ENSURE OVERLAP

| | | | |
|------|-----------|-----------------------------------|------|
| 5 | MB-439157 | NW12 HOM FLANGE | 1 |
| 4 | MB-439158 | NW40 COUPLER FLANGE | 1 |
| 3 | MD-439159 | NW78 BEAM FLANGE | 1 |
| 2 | MD-439177 | END TUBE WELDMENT (SHORT VERSION) | 1 |
| 1 | MD-439178 | END DISK WELDMENT (SHORT VERSION) | 1 |
| ITEM | PART NO. | DESCRIPTION OR SIZE | QTY. |

| PARTS LIST | | | |
|---|-----|----------------|------------|
| UNLESS OTHERWISE SPECIFIED | | ORIGINATOR | DESY |
| .X | .XX | DRAWN | E.PIRTLE |
| ± | - - | CHECKED | D.MITCHELL |
| 1. BREAK ALL SHARP EDGES 0.40 MAX | | APPROVED | M.FOLEY |
| 2. DO NOT SCALE DRAWING. | | USED ON | |
| 3. DIMENSIONS BASED UPON ASME Y14.5M-1994 | | MD-439181 | |
| 4. MAX. ALL MCH. SURFACES | | MD-440004 | |
| 5. DRAWING UNITS: METRIC, mm | | MATERIAL | |
| | | SEE PARTS LIST | |

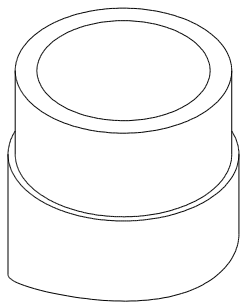
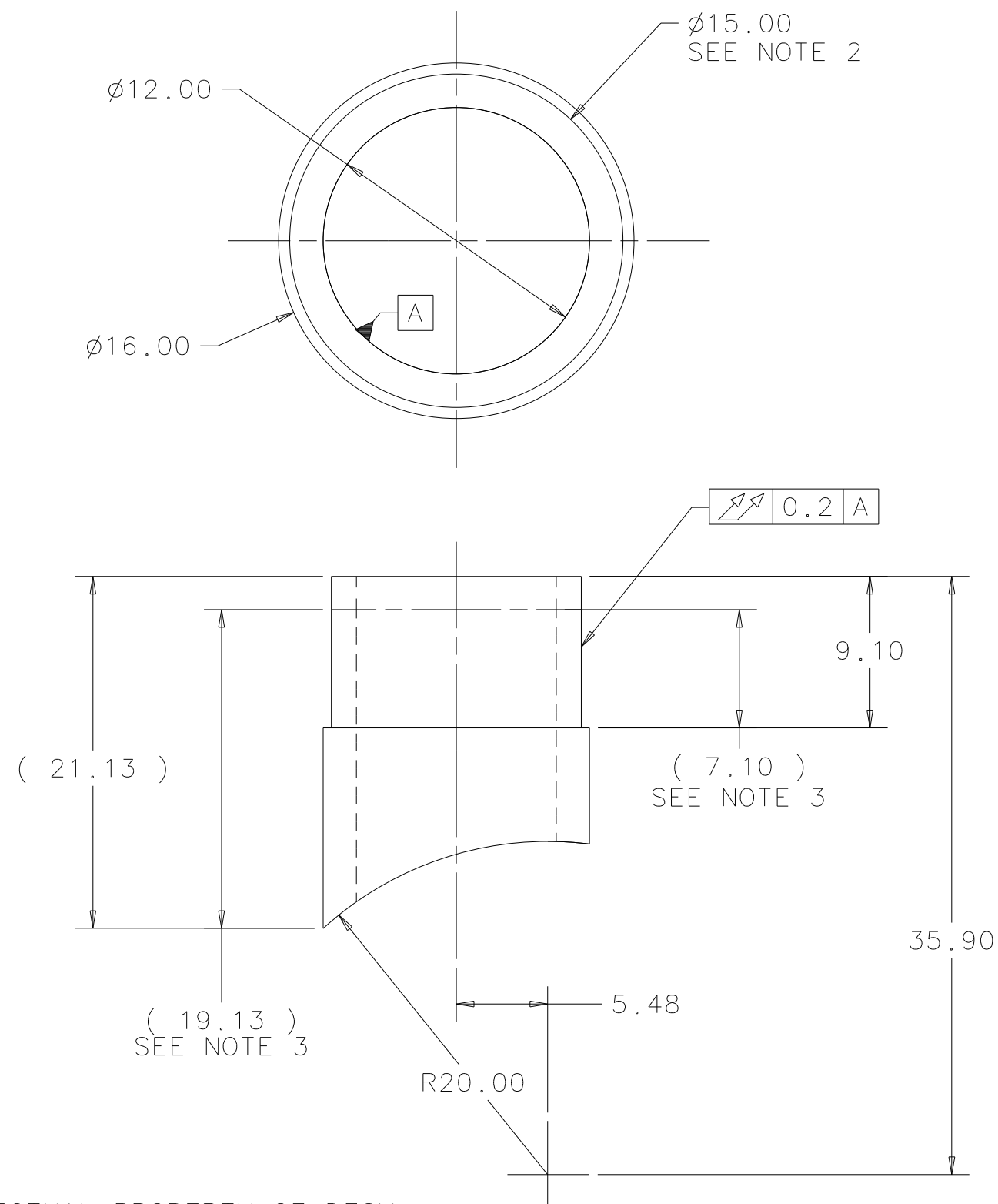
FERMI NATIONAL ACCELERATOR LABORATORY
UNITED STATES DEPARTMENT OF ENERGY

DESY 1.3GHZ TESLA
RF CAVITY
SHORT END HALF CELL ASSEMBLY

| | | | |
|--------------------------------|--------------------|---------------------------------|-----|
| SCALE | DRAWING NUMBER | SHEET | REV |
| 1:1 | 4904.010-MD-439180 | 1 OF 1 | C |
| CREATED WITH : Ideos11NXSeries | | GROUP: ACCELERATOR MECH. SUPPT. | |

THIS DESIGN IS THE INTELLECTUAL PROPERTY OF DESY
ACCORDING TO DIN 34 / ISO 16016. THIS DRAWING HAS
BEEN REDRAWN WITH DESY'S PERMISSION FOR FABRICATION
PURPOSES WITHIN THE USA AND IS TO BE USED
EXCLUSIVELY WITHIN FERMILAB. USAGE OUTSIDE OF
FERMILAB MUST BE APPROVED BY DESY.

| REV | DESCRIPTION | DRAWN | DATE |
|-----|-------------|----------|------|
| | | APPROVED | DATE |



NOTES:

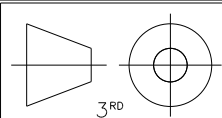
- 1) SURFACE IS TO BE FREE OF DAMAGE
- 2) DIMENSION COORESPONDS WITH PART NUMBER MD-439157. TOLERANCE IS TO BE COORDINATED BETWEEN MANUFACTURERS AND EB-WELDERS
- 3) FINAL LENGTH AFTER MACHINING OPERATION DETAILED ON DRAWING NUMBER MD-439174 AND MD-439175

| UNLESS OTHERWISE SPECIFIED | | | ORIGINATOR | DESY | |
|--|-----|------------|-----------------|------------|-------------|
| .X | .XX | ANGLE | DRAWN | E.PIRTLE | 18-APR-2005 |
| \pm | - - | \pm 0.02 | CHECKED | D.MITCHELL | 16-SEP-2005 |
| 1. BREAK ALL SHARP EDGES 0.40 MAX. | | | APPROVED | M.FOLEY | 20-SEP-2005 |
| 2. DO NOT SCALE DRAWING. | | | USED ON | | |
| 3. DIMENSIONS BASED UPON ASME Y14.5M-1994 | | | MD-439174 | | |
| 4. MAX. ALL MACH. SURFACES | | | MD-439175 | | |
| 5. DRAWING UNITS: METRIC, mm | | | MATERIAL | | |
| | | | RRR 300 NIOBIUM | | |



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UNITED STATES DEPARTMENT OF ENERGY

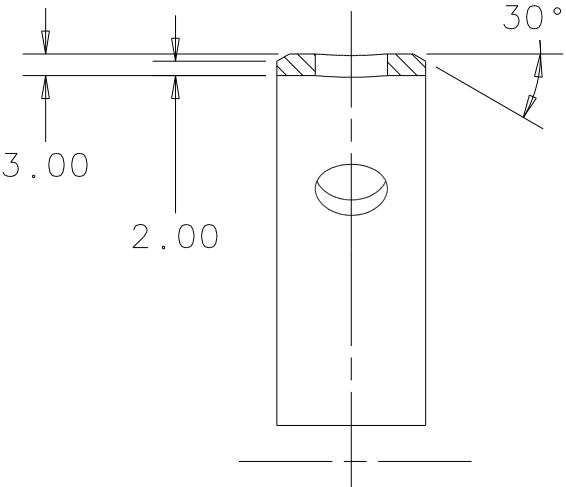
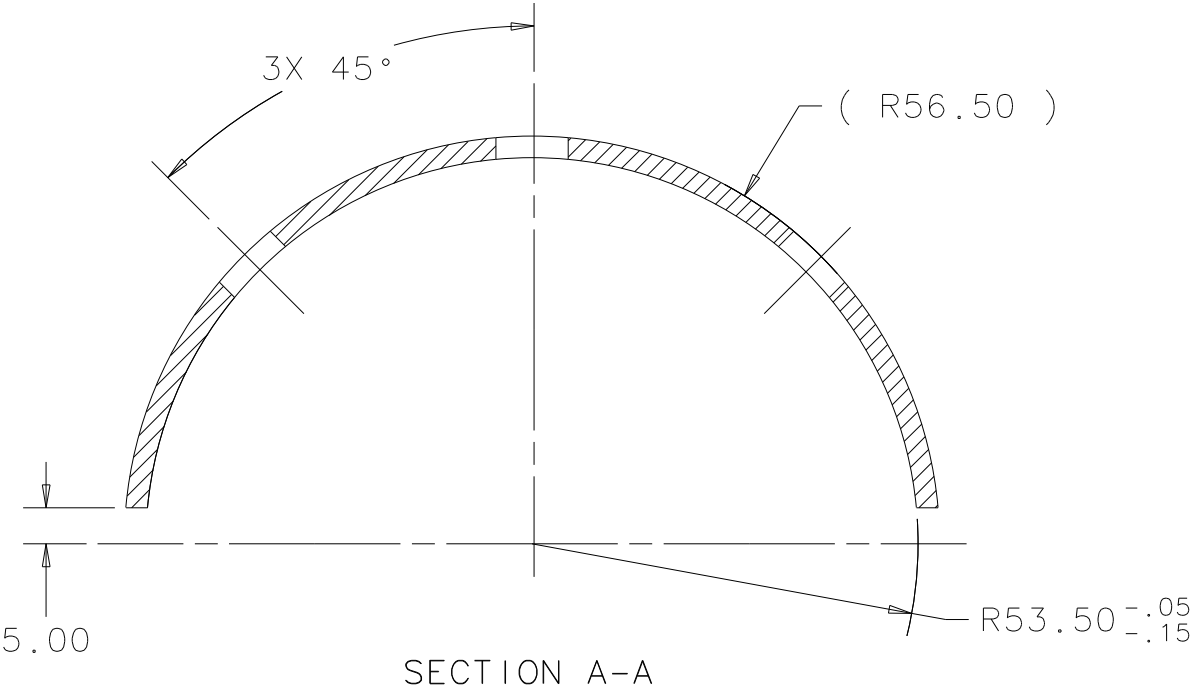
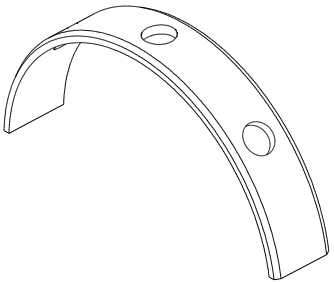
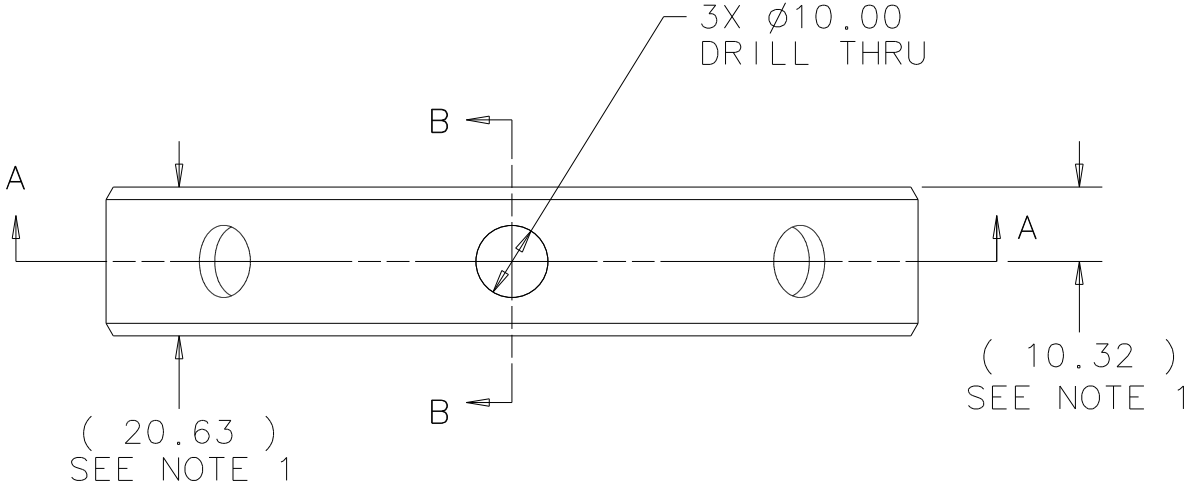
DESY 1.3GHZ TESLA
RF CAVITY
HOM SPOOL PIECE



| SCALE | DRAWING NUMBER | SHEET | REV |
|---------------------------------|--------------------|--------|-----|
| 3:1 | 4904.010-MB-439150 | 1 OF 1 | |
| CREATED WITH : Ideas11NXSeries | | | |
| GROUP: ACCELERATOR MECH. SUPPT. | | | |

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PURPOSES WITHIN THE USA AND IS TO BE USED
EXCLUSIVELY WITHIN FERMILAB. USAGE OUTSIDE OF
FERMILAB MUST BE APPROVED BY DESY.

| REV | DESCRIPTION | DRAWN | DATE |
|-----|-------------|----------|------|
| | | APPROVED | DATE |



NOTE :

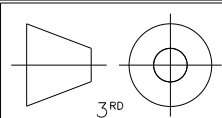
1) DIMENSIONS TO BE DETERMINED BY THE MANUFACTURER TO ALLOW FOR FUTURE EB-WELDING CONTRACTION.

| | | | | | |
|---|-----|------------|----------------------------|------------|-------------|
| UNLESS OTHERWISE SPECIFIED | | | ORIGINATOR | DESY | |
| .X | .XX | ANGLE | DRAWN | E.PIRTLE | 18-APR-2005 |
| \pm | - - | \pm 0.08 | CHECKED | D.MITCHELL | 16-SEP-2005 |
| 1. BREAK ALL SHARP EDGES 0.40 MAX. 2. DO NOT SCALE DRAWING. 3. DIMENSIONS BASED UPON ASME Y14.5M-1994 4. MAX. ALL MACH. SURFACES NB ✓ 5. DRAWING UNITS: METRIC, mm | | | APPROVED | M.FOLEY | 16-SEP-2005 |
| | | | USED ON MC-439172 | | |
| | | | MATERIAL RRR 40 NIOBIUM | | |



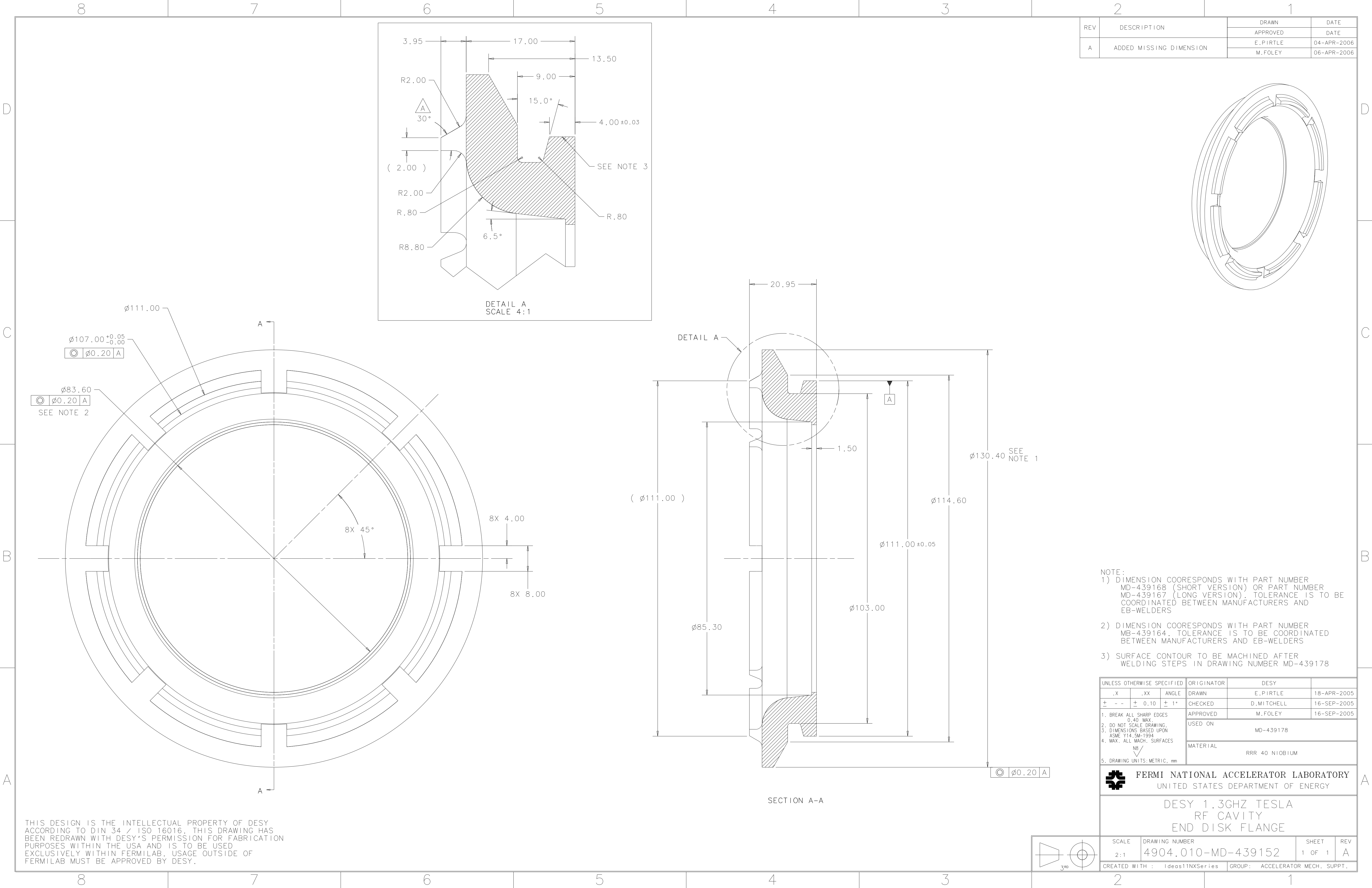
FERMI NATIONAL ACCELERATOR LABORATORY
UNITED STATES DEPARTMENT OF ENERGY

DESY 1.3GHZ TESLA
RF CAVITY
HALF SUPPORT RING



| | | | |
|--|--------------------------------------|-----------------|-----|
| SCALE 1:1 | DRAWING NUMBER 4904.010-MB-439151 | SHEET 1 OF 1 | REV |
| CREATED WITH : Ideas11NXSeries GROUP: ACCELERATOR MECH. SUPPT. | | | |

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THIS DESIGN IS THE INTELLECTUAL PROPERTY OF DESY
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PURPOSES WITHIN THE USA AND IS TO BE USED
EXCLUSIVELY WITHIN FERMILAB. USAGE OUTSIDE OF
FERMILAB MUST BE APPROVED BY DESY.

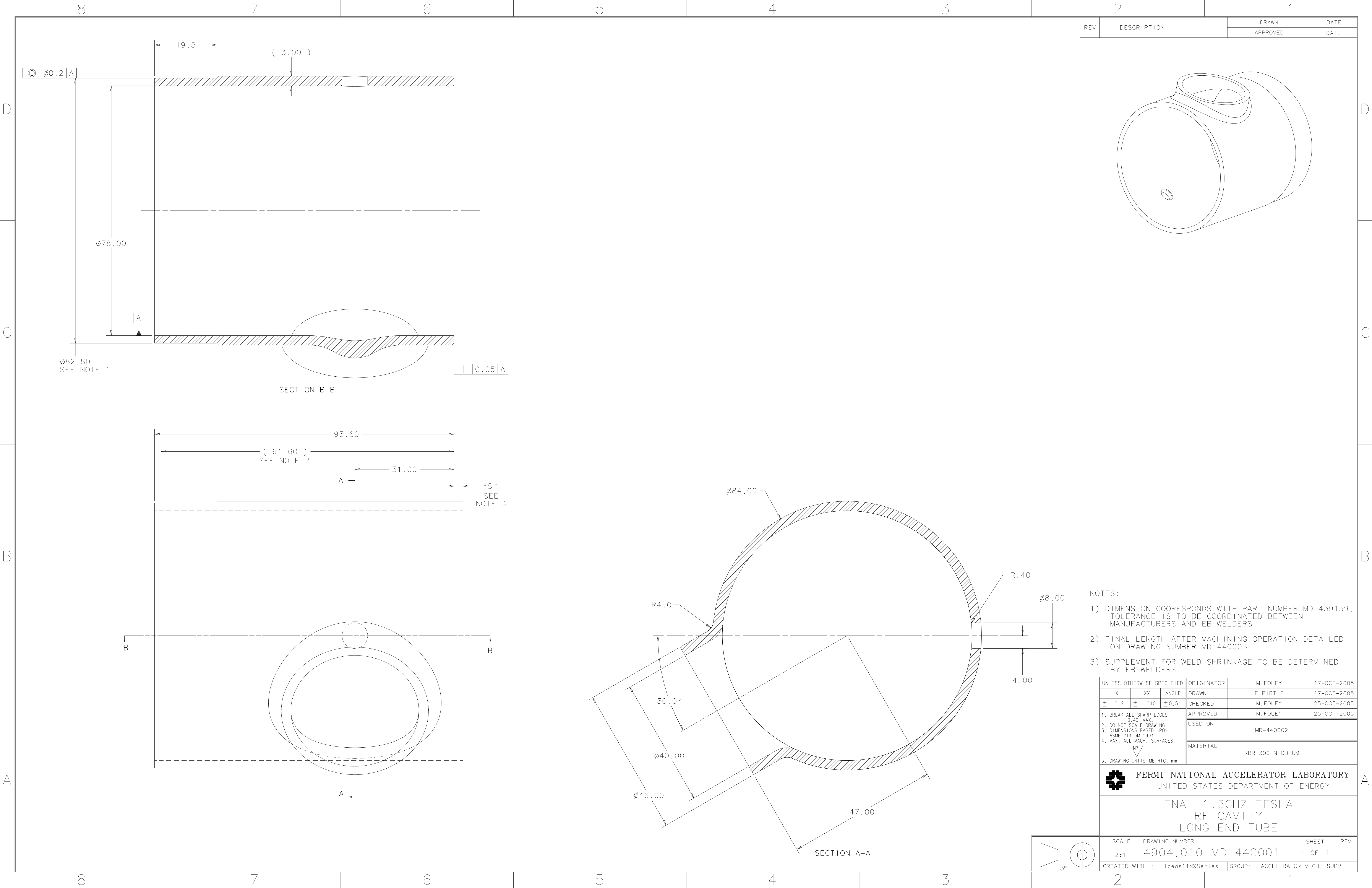
- NOTE:
- 1) DIMENSION COORESPONDS WITH PART NUMBER
MD-439168 (SHORT VERSION) OR PART NUMBER
MD-439167 (LONG VERSION). TOLERANCE IS TO BE
COORDINATED BETWEEN MANUFACTURERS AND
EB-WELDERS
 - 2) DIMENSION COORESPONDS WITH PART NUMBER
MB-439164. TOLERANCE IS TO BE COORDINATED
BETWEEN MANUFACTURERS AND EB-WELDERS
 - 3) SURFACE CONTOUR TO BE MACHINED AFTER
WELDING STEPS IN DRAWING NUMBER MD-439178

| UNLESS OTHERWISE SPECIFIED | | | ORIGINATOR | DESY | |
|--|-----|-------------|----------------------------|------------|-------------|
| .X | .XX | ANGLE | DRAWN | E.PIRTLE | 18-APR-2005 |
| ± | - - | ± 0.10 ± 1° | CHECKED | D.MITCHELL | 16-SEP-2005 |
| 1. BREAK ALL SHARP EDGES 0.40 MAX 2. DO NOT SCALE DRAWING. 3. DIMENSIONS BASED UPON ASME Y14.5M-1994 4. MAX. ALL MACH. SURFACES 5. DRAWING UNITS: METRIC, mm | | | APPROVED | M.FOLEY | 16-SEP-2005 |
| | | | USED ON MD-439178 | | |
| | | | MATERIAL RRR 40 NIOBIUM | | |

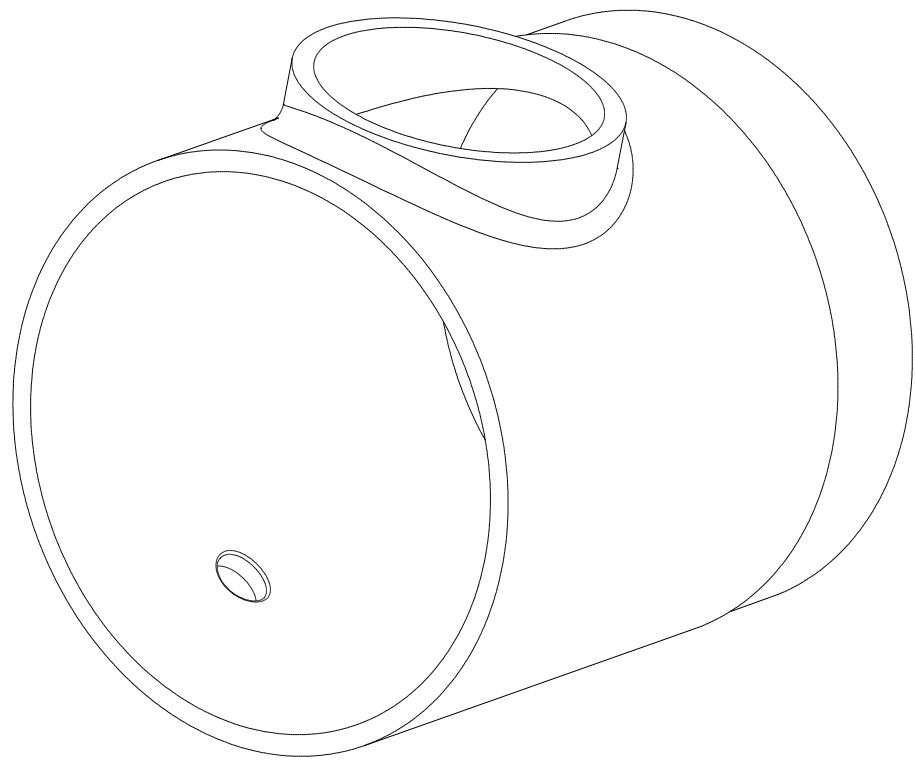
FERMI NATIONAL ACCELERATOR LABORATORY
UNITED STATES DEPARTMENT OF ENERGY

DESY 1.3GHZ TESLA
RF CAVITY
END DISK FLANGE

| SCALE | DRAWING NUMBER | SHEET | REV |
|--------------------------------|--------------------|---------------------------------|-----|
| 2:1 | 4904.010-MD-439152 | 1 OF 1 | A |
| CREATED WITH : Ideos11NXSeries | | GROUP: ACCELERATOR MECH. SUPPT. | |



| REV | DESCRIPTION | DRAWN | DATE |
|-----|-------------|----------|------|
| | | APPROVED | DATE |



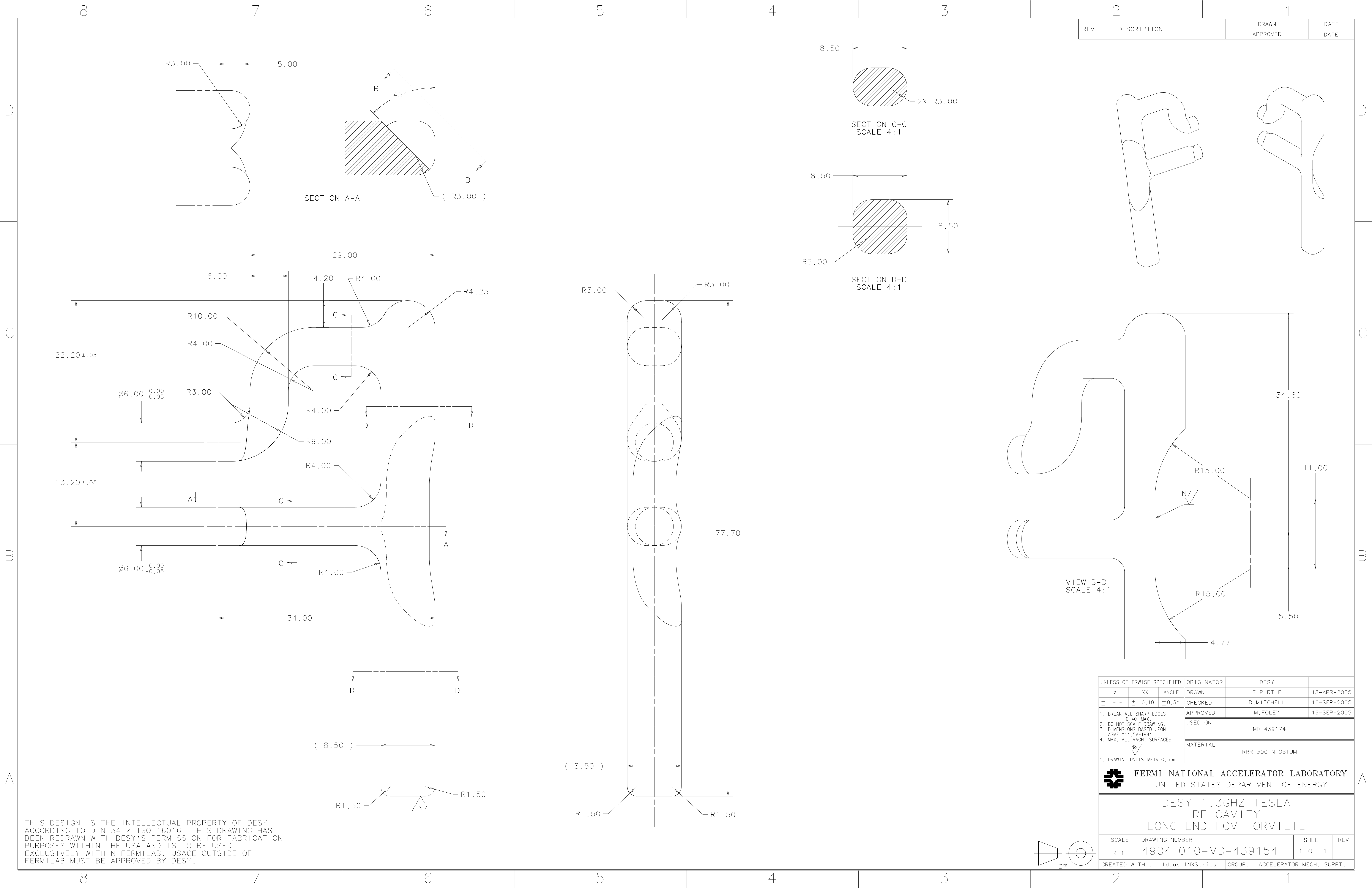
- NOTES:
- 1) DIMENSION COORESponds WITH PART NUMBER MD-439159. TOLERANCE IS TO BE COORDINATED BETWEEN MANUFACTURERS AND EB-WELDERS
 - 2) FINAL LENGTH AFTER MACHINING OPERATION DETAILED ON DRAWING NUMBER MD-440003
 - 3) SUPPLEMENT FOR WELD SHRINKAGE TO BE DETERMINED BY EB-WELDERS

| UNLESS OTHERWISE SPECIFIED | | | ORIGINATOR | M.FOLEY | 17-OCT-2005 |
|--|--------|-------|-----------------------------|----------|-------------|
| .X | .XX | ANGLE | DRAWN | E.PIRTLE | 17-OCT-2005 |
| ± 0.2 | ± .010 | ±0.5° | CHECKED | M.FOLEY | 25-OCT-2005 |
| 1. BREAK ALL SHARP EDGES 0.40 MAX 2. DO NOT SCALE DRAWING. 3. DIMENSIONS BASED UPON ASME Y14.5M-1994 4. MAX. ALL MACH. SURFACES N7 5. DRAWING UNITS: METRIC, mm | | | APPROVED | M.FOLEY | 25-OCT-2005 |
| | | | USED ON MD-440002 | | |
| | | | MATERIAL RRR 300 NIOBIUM | | |

 **FERMI NATIONAL ACCELERATOR LABORATORY**
UNITED STATES DEPARTMENT OF ENERGY

FNAL 1.3GHZ TESLA
RF CAVITY
LONG END TUBE

| SCALE | DRAWING NUMBER | SHEET | REV |
|--------------------------------|--------------------|---------------------------------|-----|
| 2:1 | 4904.010-MD-440001 | 1 OF 1 | |
| CREATED WITH : Ideos11NXSeries | | GROUP: ACCELERATOR MECH. SUPPT. | |



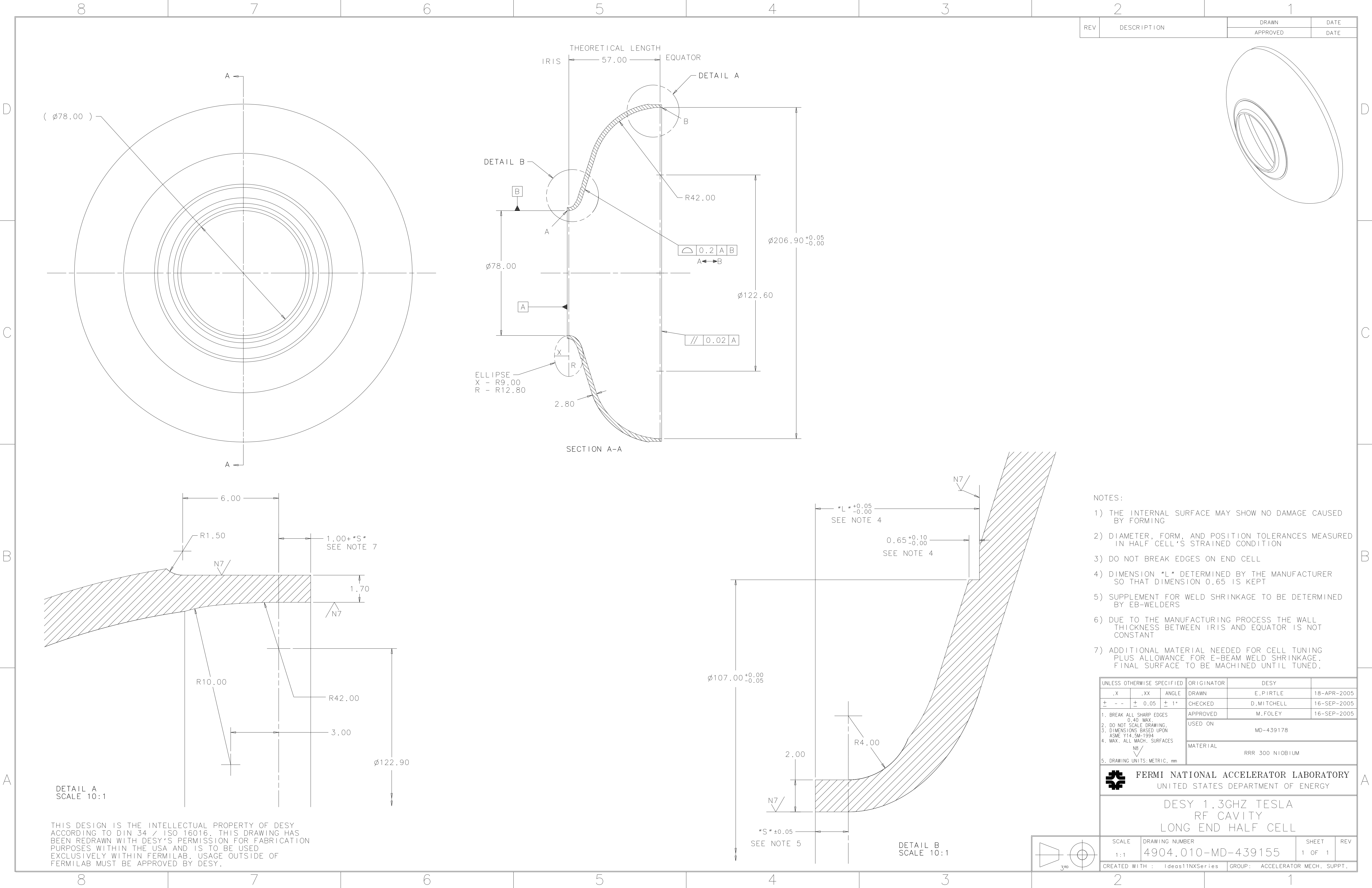
THIS DESIGN IS THE INTELLECTUAL PROPERTY OF DESY
ACCORDING TO DIN 34 / ISO 16016. THIS DRAWING HAS
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PURPOSES WITHIN THE USA AND IS TO BE USED
EXCLUSIVELY WITHIN FERMILAB. USAGE OUTSIDE OF
FERMILAB MUST BE APPROVED BY DESY.

| UNLESS OTHERWISE SPECIFIED | | | ORIGINATOR | DESY | |
|--|-----|--------|-----------------------------|-------------|-------------|
| .X | .XX | ANGLE | DRAWN | E. PIRTLE | 18-APR-2005 |
| ± | - - | ± 0.10 | CHECKED | D. MITCHELL | 16-SEP-2005 |
| 1. BREAK ALL SHARP EDGES 0.40 MAX 2. DO NOT SCALE DRAWING. 3. DIMENSIONS BASED UPON ASME Y14.5M-1994 4. MAX. ALL MACH. SURFACES N7 5. DRAWING UNITS: METRIC, mm | | | APPROVED | M. FOLEY | 16-SEP-2005 |
| | | | USED ON MD-439174 | | |
| | | | MATERIAL RRR 300 NIOBIUM | | |

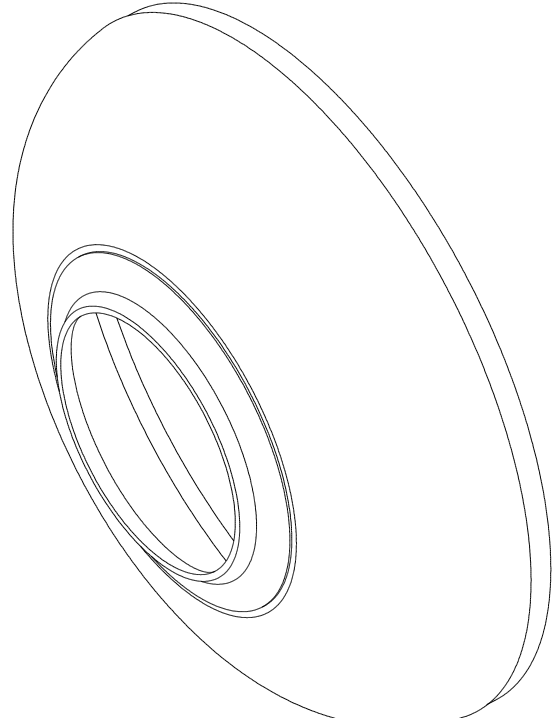
FERMI NATIONAL ACCELERATOR LABORATORY
UNITED STATES DEPARTMENT OF ENERGY

DESY 1.3GHz TESLA
RF CAVITY
LONG END HOM FORMTEÍL


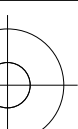
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|--------------------------------|--------------------------------------|---------------------------------|-----|
| SCALE 4:1 | DRAWING NUMBER 4904.010-MD-439154 | SHEET 1 OF 1 | REV |
| CREATED WITH : Ideos11NXSeries | | GROUP: ACCELERATOR MECH. SUPPT. | |



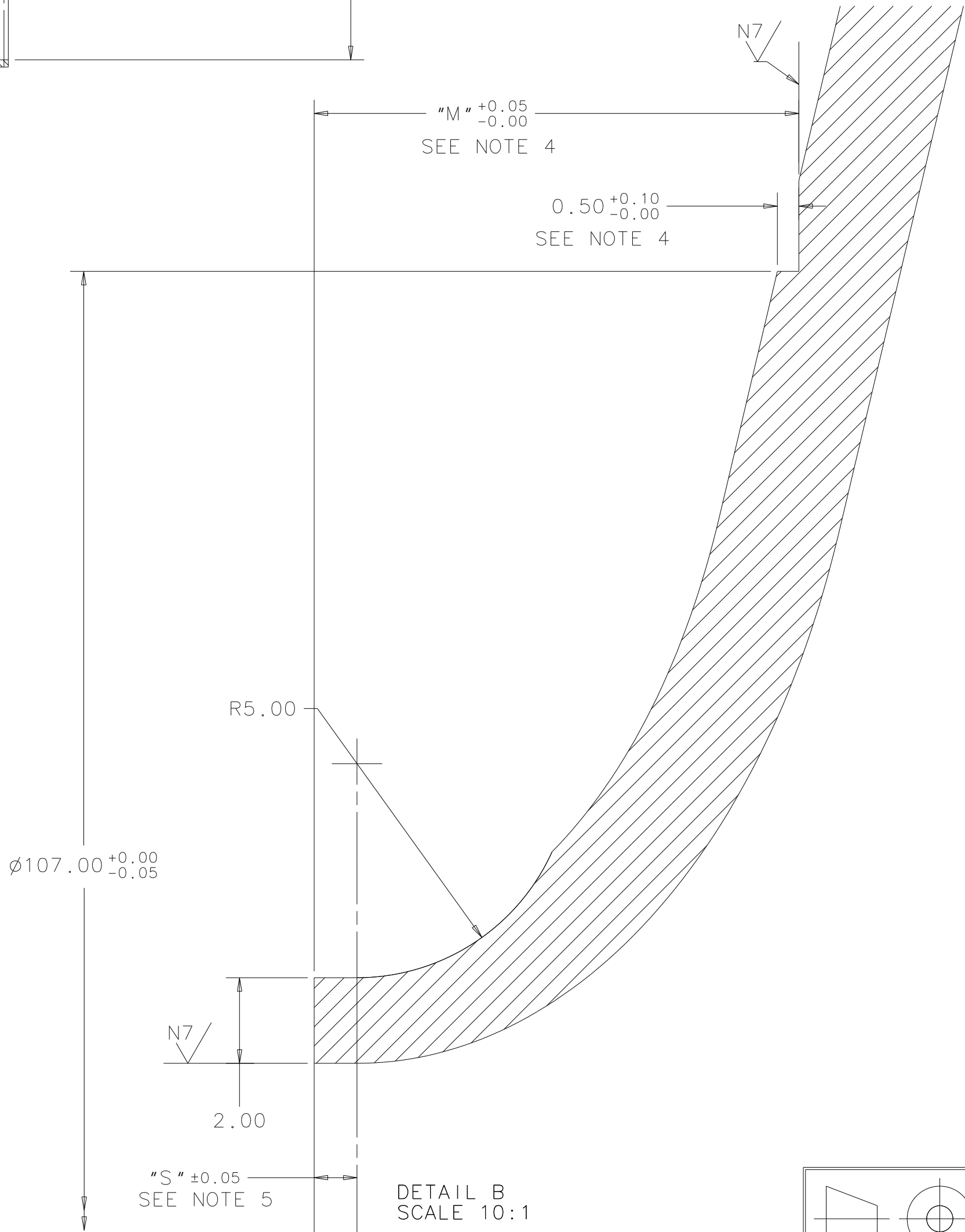
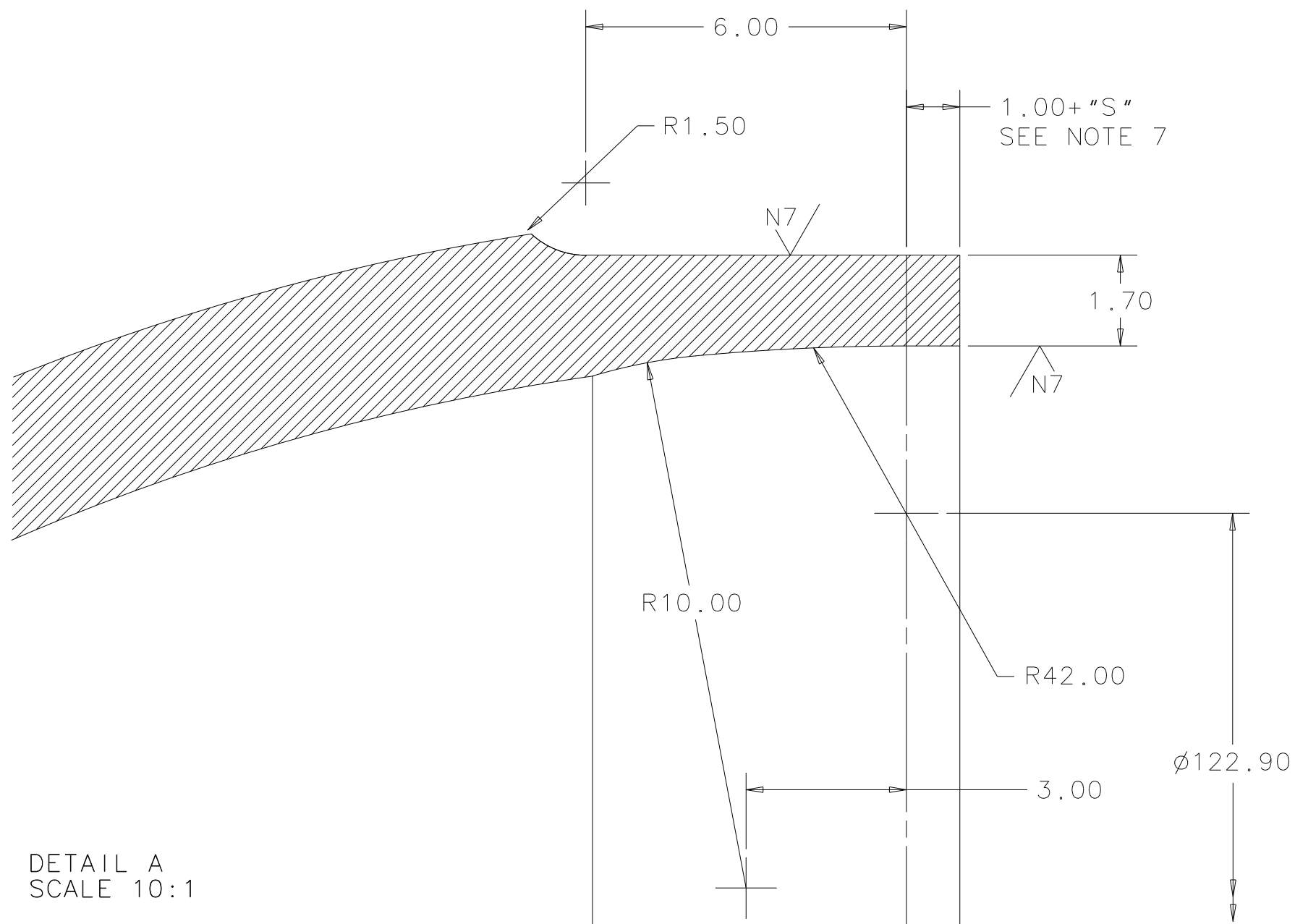
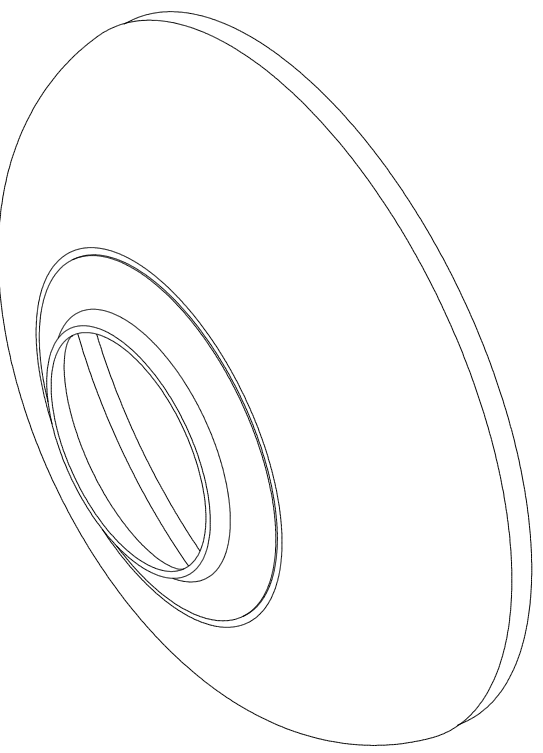
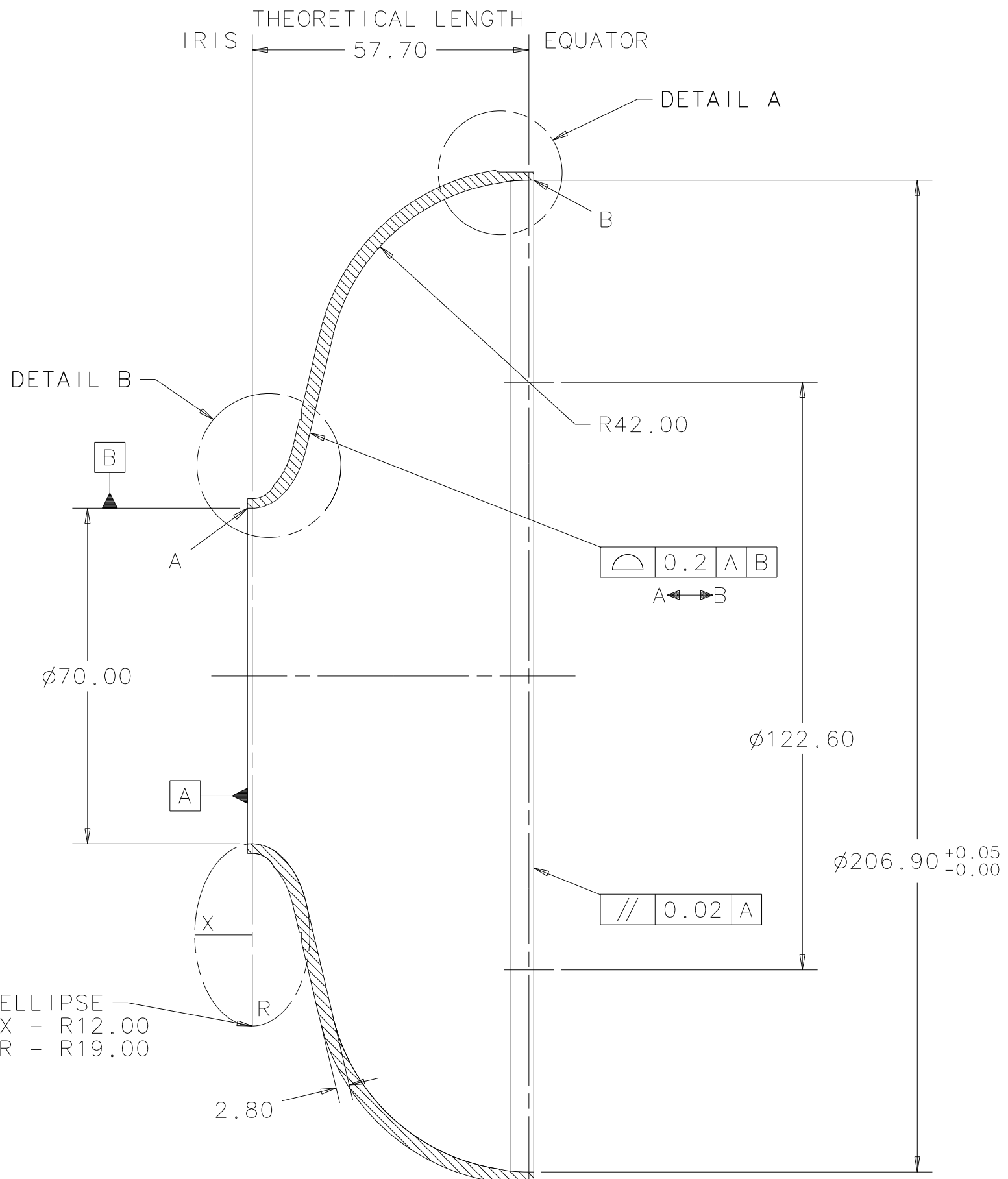
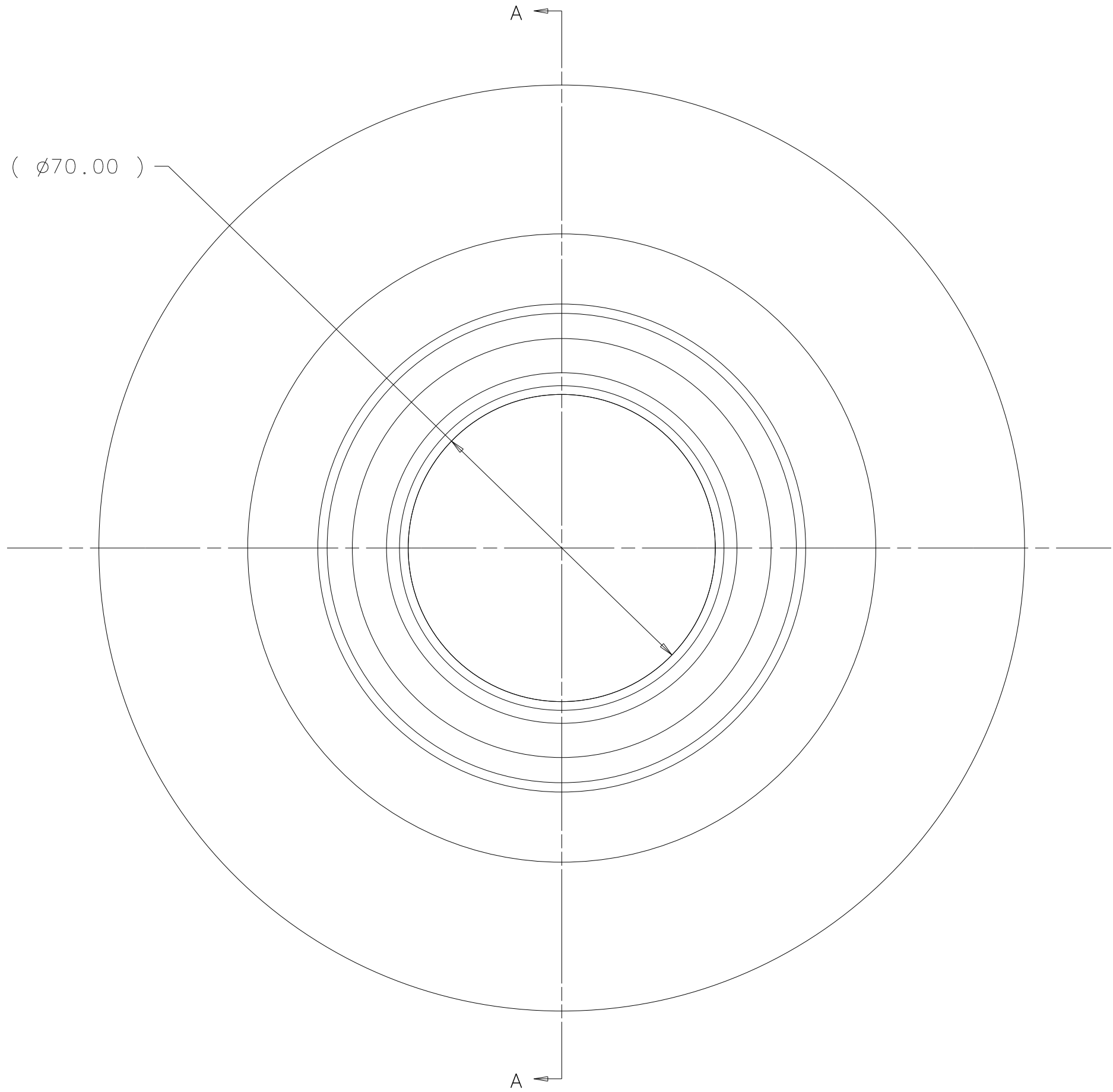
| REV | DESCRIPTION | DRAWN | DATE |
|-----|-------------|----------|------|
| | | APPROVED | DATE |



- NOTES:
- 1) THE INTERNAL SURFACE MAY SHOW NO DAMAGE CAUSED BY FORMING
 - 2) DIAMETER, FORM, AND POSITION TOLERANCES MEASURED IN HALF CELL'S STRAINED CONDITION
 - 3) DO NOT BREAK EDGES ON END CELL
 - 4) DIMENSION "L" DETERMINED BY THE MANUFACTURER SO THAT DIMENSION 0.65 IS KEPT
 - 5) SUPPLEMENT FOR WELD SHRINKAGE TO BE DETERMINED BY EB-WELDERS
 - 6) DUE TO THE MANUFACTURING PROCESS THE WALL THICKNESS BETWEEN IRIS AND EQUATOR IS NOT CONSTANT
 - 7) ADDITIONAL MATERIAL NEEDED FOR CELL TUNING PLUS ALLOWANCE FOR E-BEAM WELD SHRINKAGE. FINAL SURFACE TO BE MACHINED UNTIL TUNED.

| | | | | | | | |
|---|-------|--------------------|---------------------------------|----------|-------------|-------------|-----|
| UNLESS OTHERWISE SPECIFIED | | | ORIGINATOR | | DESY | | |
| .X | .XX | ANGLE | DRAWN | E.PIRTLE | 18-APR-2005 | | |
| ± | - - | ± 0.05 | ± 1° | CHECKED | D.MITCHELL | 16-SEP-2005 | |
| 1. BREAK ALL SHARP EDGES 0.40 MAX. 2. DO NOT SCALE DRAWING. 3. DIMENSIONS BASED UPON ASME Y14.5M-1994 4. MAX. ALL MACH. SURFACES N8 5. DRAWING UNITS: METRIC, mm | | | APPROVED | M.FOLEY | 16-SEP-2005 | | |
| | | | USED ON MD-439178 | | | | |
| | | | MATERIAL RRR 300 NIOBIUM | | | | |
| <div></div> <div>FERMI NATIONAL ACCELERATOR LABORATORY</div> <div>UNITED STATES DEPARTMENT OF ENERGY</div> | | | | | | | |
| DESY 1.3GHZ TESLA RF CAVITY LONG END HALF CELL | | | | | | | |
|  | SCALE | DRAWING NUMBER | | | | SHEET | REV |
| | 1:1 | 4904.010-MD-439155 | | | | 1 OF 1 | |
| CREATED WITH : Ideos11NXSeries | | | GROUP: ACCELERATOR MECH. SUPPT. | | | | |

| REV | DESCRIPTION | DRAWN | DATE |
|-----|-------------|----------|------|
| | | APPROVED | DATE |



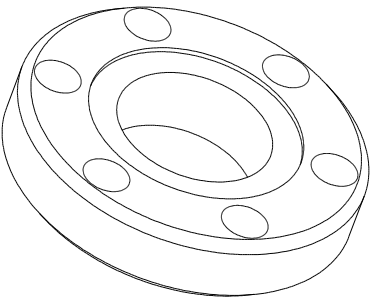
- NOTES:
- 1) THE INTERNAL SURFACE MAY SHOW NO DAMAGE CAUSED BY FORMING
 - 2) DIAMETER, FORM, AND POSITION TOLERANCES MEASURED IN HALF CELL'S STRAINED CONDITION
 - 3) DO NOT BREAK EDGES ON END CELL
 - 4) DIMENSION "M" DETERMINED BY THE MANUFACTURER SO THAT DIMENSION 0.50 IS KEPT
 - 5) SUPPLEMENT FOR WELD SHRINKAGE TO BE DETERMINED BY EB-WELDERS
 - 6) DUE TO THE MANUFACTURING PROCESS THE WALL THICKNESS BETWEEN IRIS AND EQUATOR IS NOT CONSTANT
 - 7) ADDITIONAL MATERIAL NEEDED FOR CELL TUNING PLUS ALLOWANCE FOR E-BEAM WELD SHRINKAGE. FINAL SURFACE TO BE MACHINED UNTIL TUNED.

| UNLESS OTHERWISE SPECIFIED | | | ORIGINATOR | DESY | |
|---|-----|--------|-----------------------------|------------|-------------|
| .X | .XX | ANGLE | DRAWN | E.PIRTLE | 18-APR-2005 |
| ± | - | ± 0.05 | CHECKED | D.MITCHELL | 16-SEP-2005 |
| 1. BREAK ALL SHARP EDGES 2. DO NOT SCALE DRAWING. 3. DIMENSIONS BASED UPON ASME Y14.5M-1994 4. MAX. ALL MACH. SURFACES 5. DRAWING UNITS: METRIC, mm | | | APPROVED | M.FOLEY | 16-SEP-2005 |
| | | | USED ON MC-439172 | | |
| | | | MATERIAL RRR 300 NIOBIUM | | |

| FERMI NATIONAL ACCELERATOR LABORATORY UNITED STATES DEPARTMENT OF ENERGY | | | | |
|---|--------------------------------------|---------------------------------|-----|--|
| DESY 1.3GHZ TESLA RF CAVITY MID HALF CELL | | | | |
| SCALE 1:1 | DRAWING NUMBER 4904.010-MD-439156 | SHEET 1 OF 1 | REV | |
| CREATED WITH : Ideos11NXSeries | | GROUP: ACCELERATOR MECH. SUPPT. | | |

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| REV | DESCRIPTION | DRAWN | DATE |
|-----|-------------|----------|------|
| | | APPROVED | DATE |



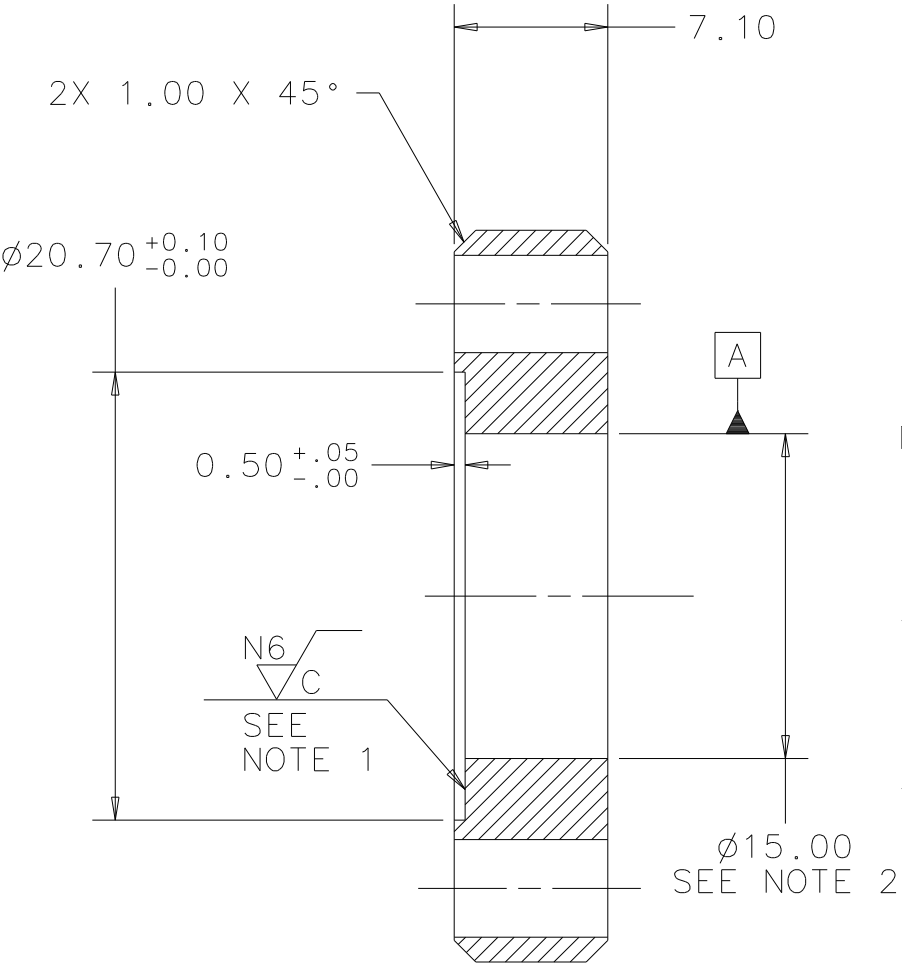
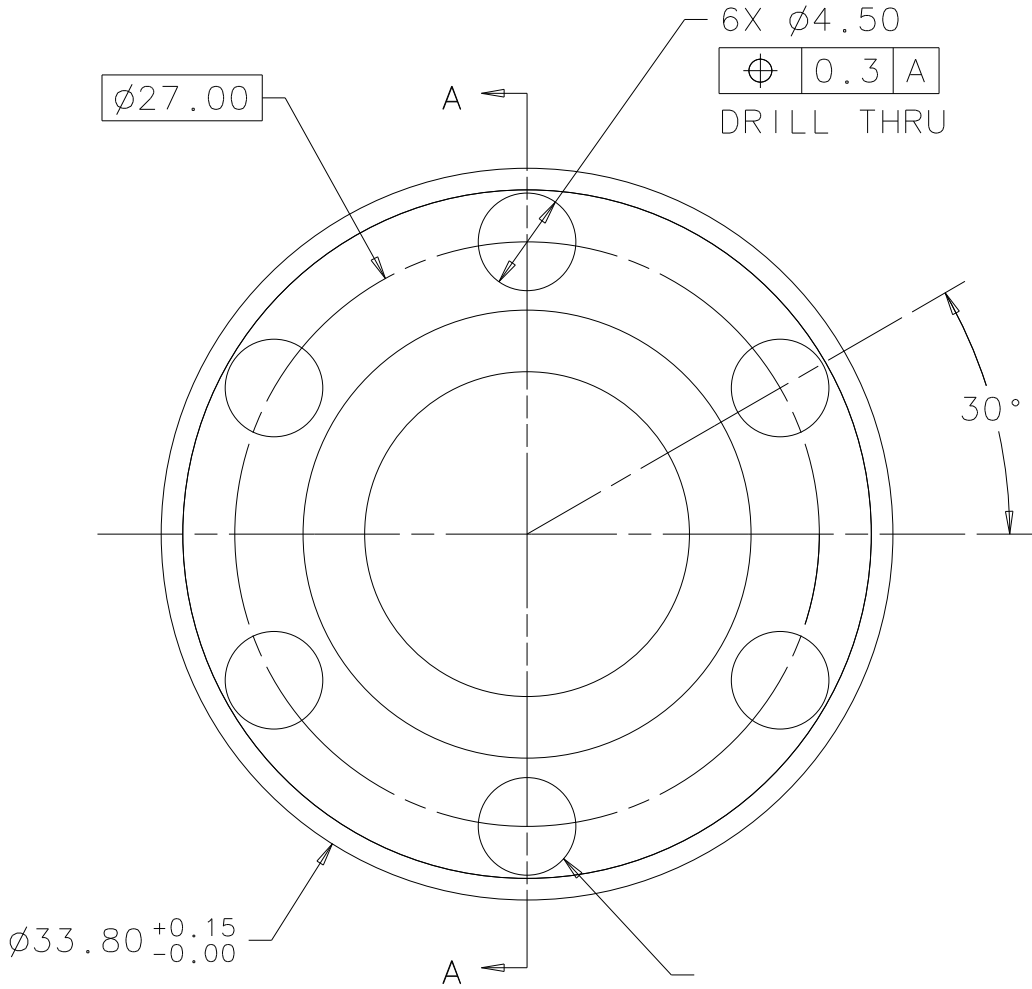
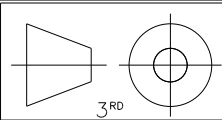
- NOTE:
- 1) SEALING SURFACE MUST BE FREE OF SCRATCHES WITH NO RADIAL SCORING
 - 2) DIMENSION COORESponds WITH PART NUMBER MB-439150. TOLERANCE IS TO BE COORDINATED BETWEEN MANUFACTURERS AND EB-WELDERS
 - 3) USE PRIMARY MILLIMETER DIMENSIONS TO MAKE PART. [INCHES] SHOWN FOR REFERENCE

| | | | | | |
|--|-----|-------------|----------------------|------------|-------------|
| UNLESS OTHERWISE SPECIFIED | | | ORIGINATOR | DESIGN | |
| .X | .XX | ANGLE | DRAWN | E.PIRTLE | 18-APR-2005 |
| ± | - - | ± 0.20 ± 1° | CHECKED | D.MITCHELL | 16-SEP-2005 |
| 1. BREAK ALL SHARP EDGES 0.40 MAX. 2. DO NOT SCALE DRAWING. 3. DIMENSIONS BASED UPON ASME Y14.5M-1994 4. MAX. ALL MACH. SURFACES N7/ | | | APPROVED | M.FOLEY | 16-SEP-2005 |
| | | | USED ON | | |
| | | | MD-439179 | | |
| | | | MATERIAL | | |
| 5. DRAWING UNITS: METRIC | | | NIOBIUM-TITANIUM 55% | | |

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UNITED STATES DEPARTMENT OF ENERGY

DESIGN 1.3GHZ TESLA
RF CAVITY
NW 12 FLANGE

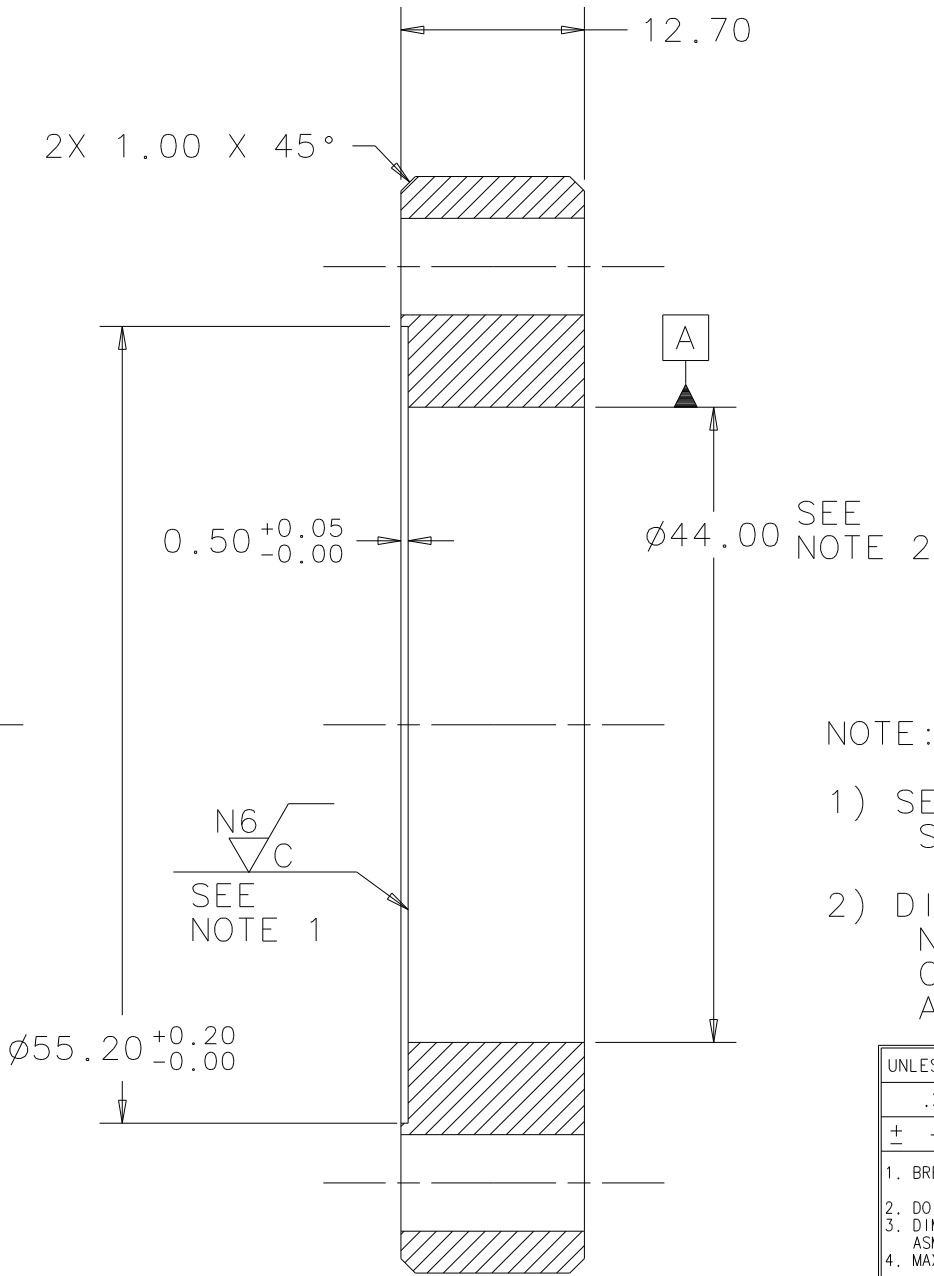
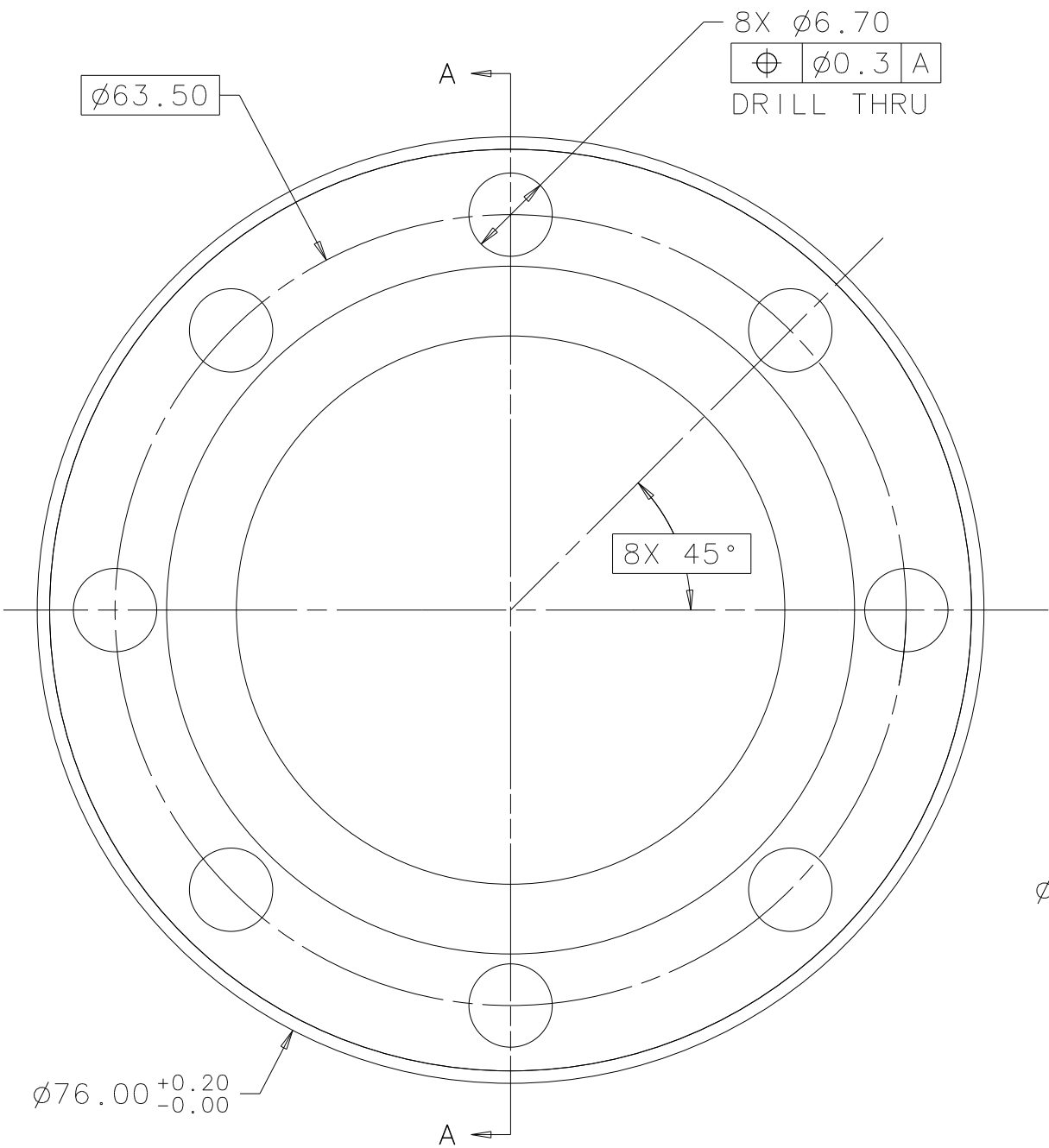
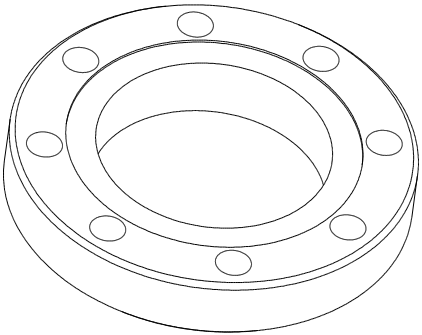
| | | | |
|--------------------------------|--------------------|---------------------------------|-----|
| SCALE | DRAWING NUMBER | SHEET | REV |
| 3:1 | 4904.010-MB-439157 | 1 OF 1 | |
| CREATED WITH : Ideas11NXSeries | | GROUP: ACCELERATOR MECH. SUPPT. | |



SECTION A-A

THIS DESIGN IS THE INTELLECTUAL PROPERTY OF DESY ACCORDING TO DIN 34 / ISO 16016. THIS DRAWING HAS BEEN REDRAWN WITH DESY'S PERMISSION FOR FABRICATION PURPOSES WITHIN THE USA AND IS TO BE USED EXCLUSIVELY WITHIN FERMILAB. USAGE OUTSIDE OF FERMILAB MUST BE APPROVED BY DESY.

| REV | DESCRIPTION | DRAWN | DATE |
|-----|-------------|----------|------|
| | | APPROVED | DATE |



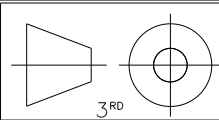
- NOTE :
- 1) SEALING SURFACE MUST BE FREE OF SCRATCHES WITH NO RADIAL SCORING
 - 2) DIMENSION COORESPONDS WITH PART NUMBER MB-439171. TOLERANCE IS TO BE COORDINATED BETWEEN MANUFACTURERS AND EB-WELDERS

| UNLESS OTHERWISE SPECIFIED | | | ORIGINATOR | DESY | |
|---|-----|------------|----------------------|------------|-------------|
| .X | .XX | ANGLE | DRAWN | E.PIRTLE | 18-APR-2005 |
| \pm | - - | ± 0.20 | CHECKED | D.MITCHELL | 16-SEP-2005 |
| 1. BREAK ALL SHARP EDGES 0.40 MAX. 2. DO NOT SCALE DRAWING. 3. DIMENSIONS BASED UPON ASME Y14.5M-1994 4. MAX. ALL MACH. SURFACES N7 5. DRAWING UNITS: METRIC, mm | | | APPROVED | M.FOLEY | 16-SEP-2005 |
| | | | USED ON | | |
| | | | MD-439180 | | |
| | | | MATERIAL | | |
| | | | NIOBIUM-TITANIUM 55% | | |



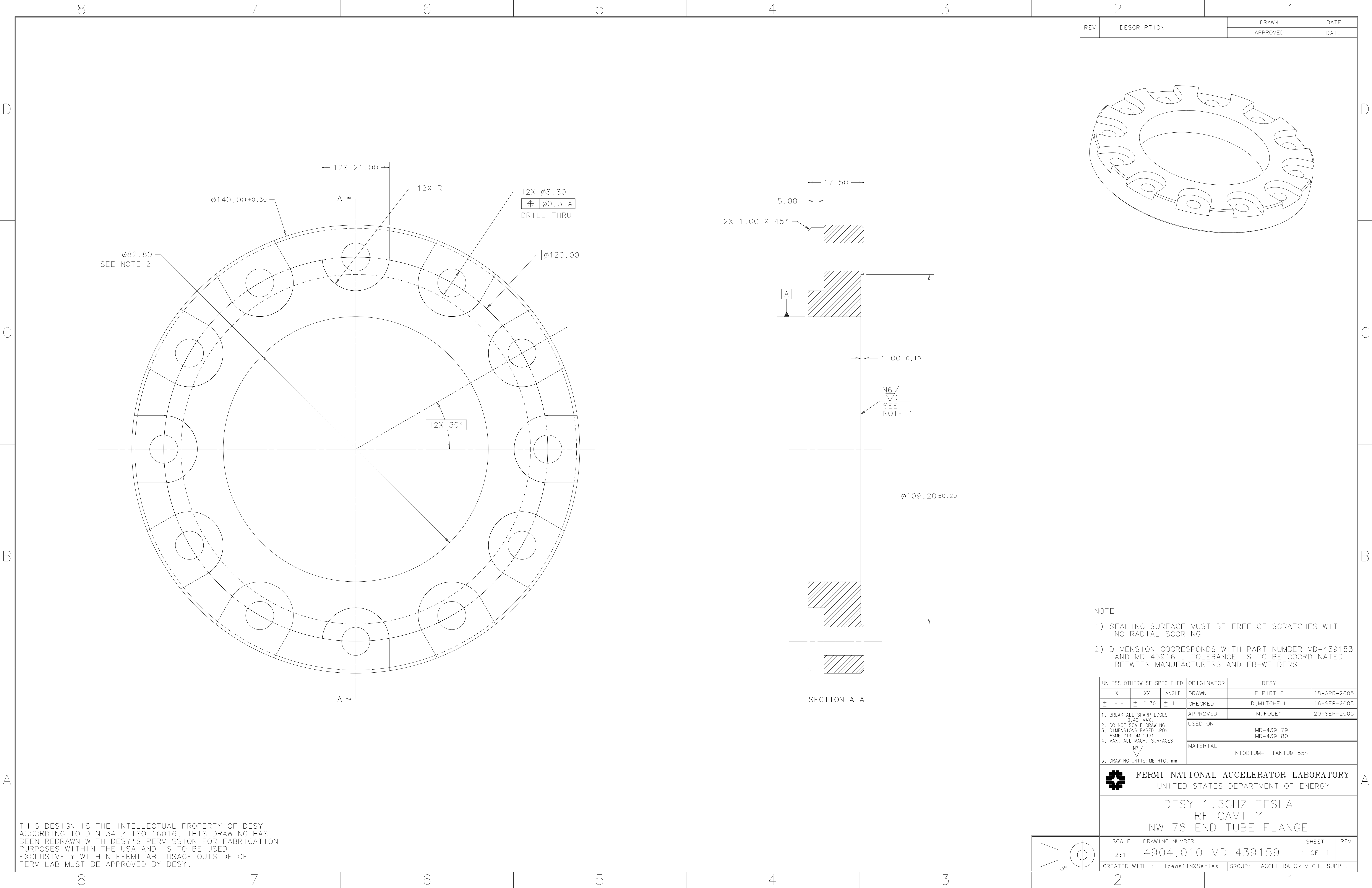
FERMI NATIONAL ACCELERATOR LABORATORY
UNITED STATES DEPARTMENT OF ENERGY

DESY 1.3GHZ TESLA
RF CAVITY
NW 40 FLANGE

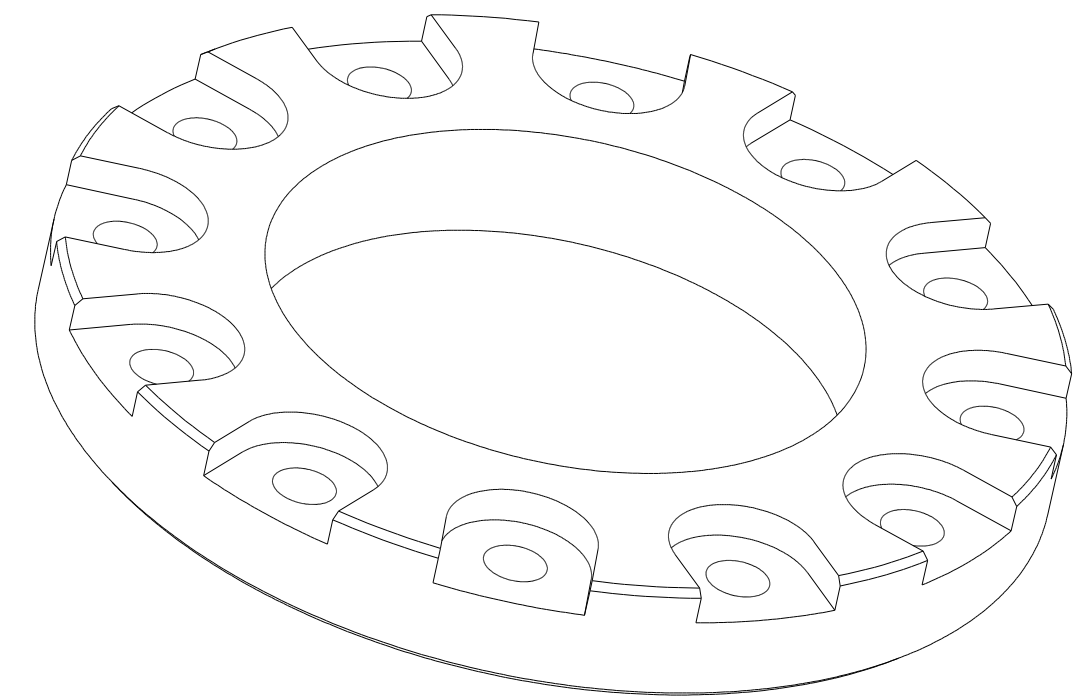


| SCALE | DRAWING NUMBER | SHEET | REV |
|---|--------------------|--------|-----|
| 2:1 | 4904.010-MB-439158 | 1 OF 1 | |
| CREATED WITH : Ideas11NXSeries GROUP: ACCELERATOR MECH. SUPPT. | | | |

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PURPOSES WITHIN THE USA AND IS TO BE USED
EXCLUSIVELY WITHIN FERMILAB. USAGE OUTSIDE OF
FERMILAB MUST BE APPROVED BY DESY.



| REV | DESCRIPTION | DRAWN | DATE |
|-----|-------------|----------|------|
| | | APPROVED | DATE |



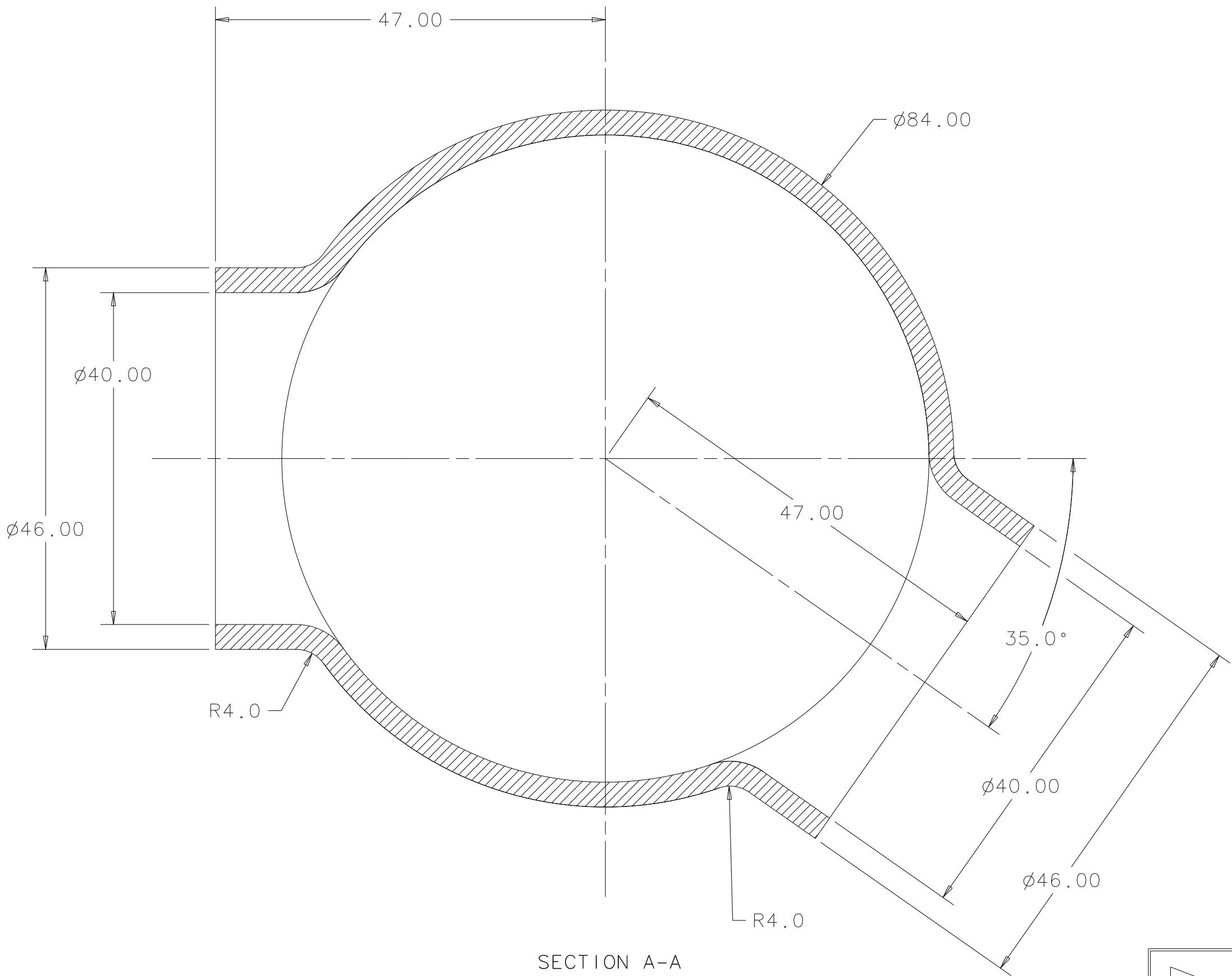
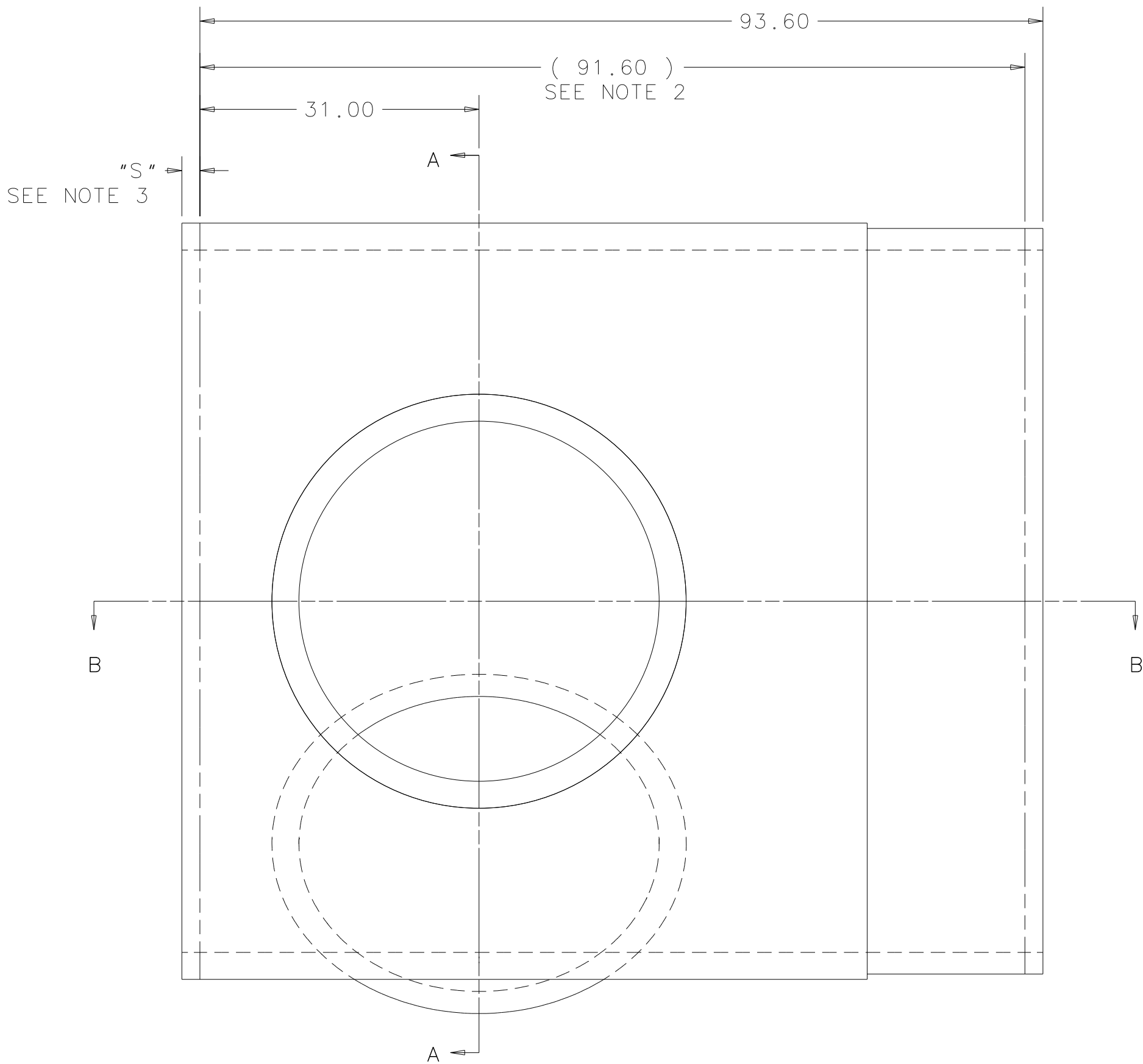
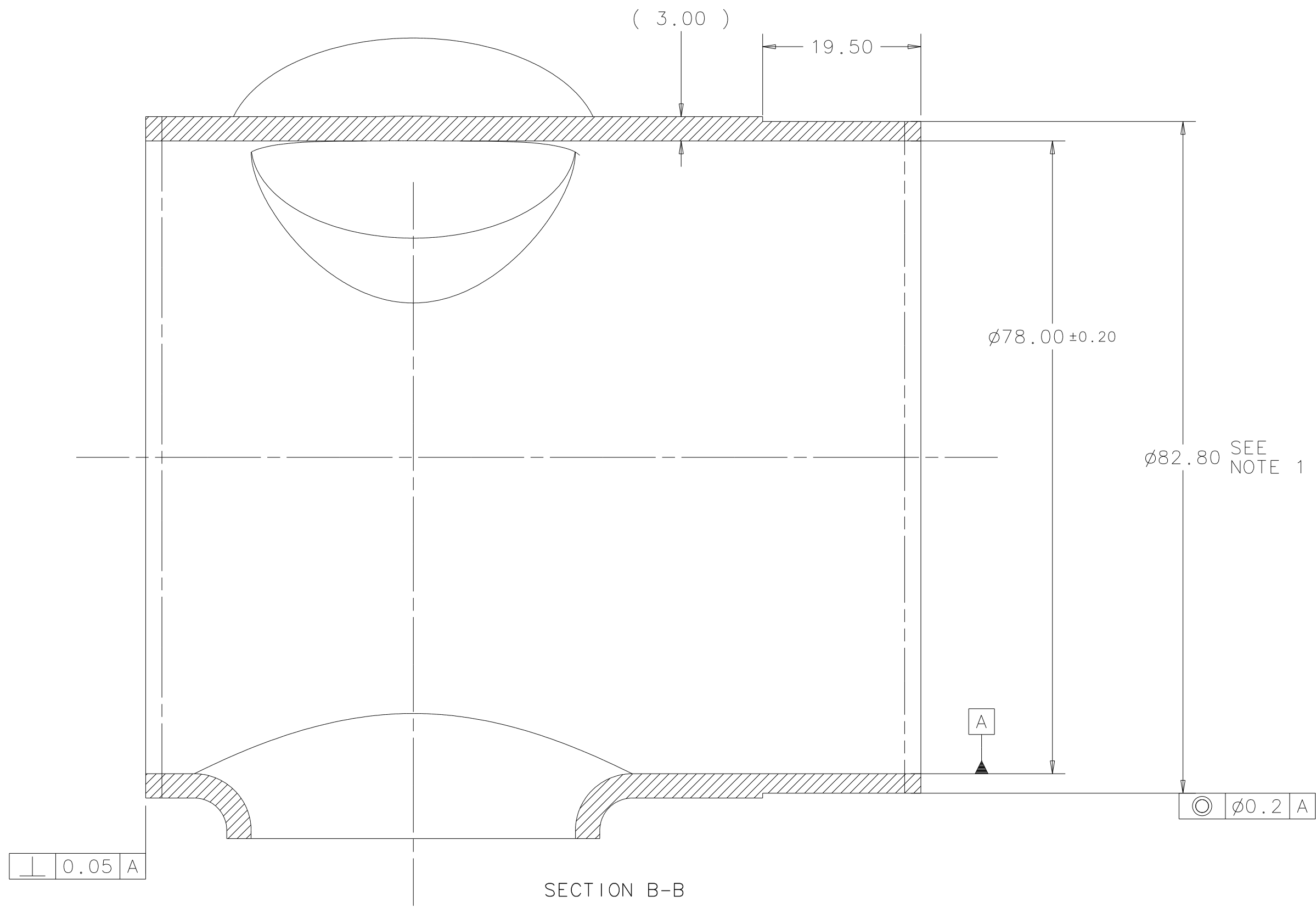
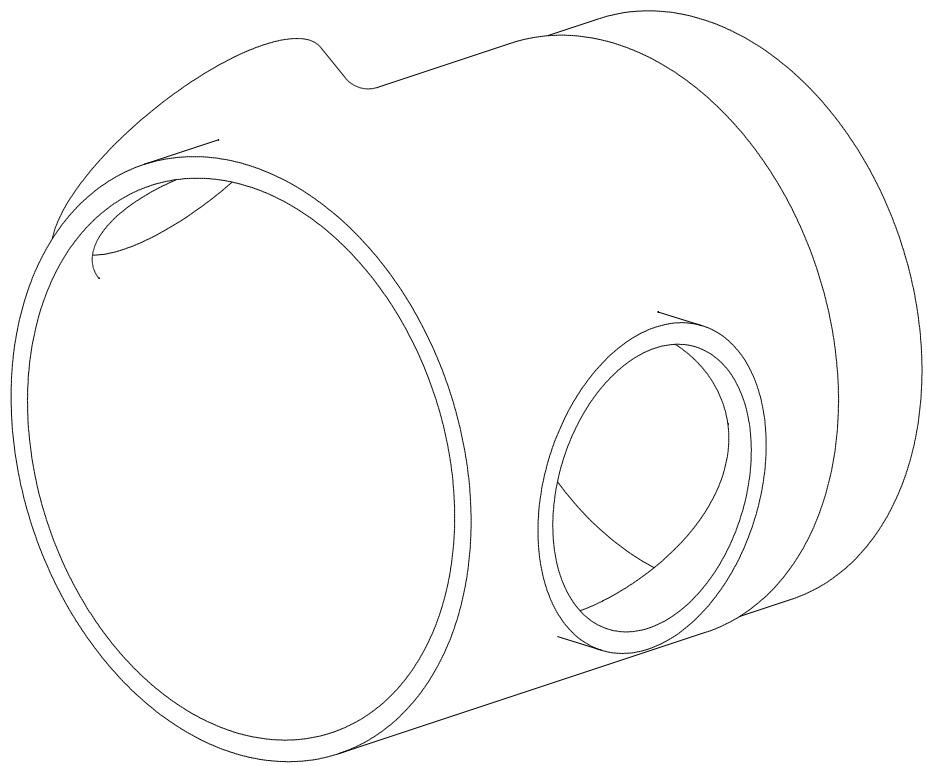
- NOTE:
- SEALING SURFACE MUST BE FREE OF SCRATCHES WITH NO RADIAL SCORING
 - DIMENSION COORESponds WITH PART NUMBER MD-439153 AND MD-439161. TOLERANCE IS TO BE COORDINATED BETWEEN MANUFACTURERS AND EB-WELDERS

| UNLESS OTHERWISE SPECIFIED | ORIGINATOR | DESIGN | |
|---|----------------------|------------|-------------|
| .X | .XX | ANGLE | DRAWN |
| ± | - | ± 0.30 | ± 1° |
| 1. BREAK ALL SHARP EDGES 0.40 MAX | CHECKED | D.MITCHELL | 16-SEP-2005 |
| 2. DO NOT SCALE DRAWING. | APPROVED | M.FOLEY | 20-SEP-2005 |
| 3. DIMENSIONS BASED UPON ASME Y14.5M-1994 | USED ON | | |
| 4. MAX. ALL MACH. SURFACES | MD-439179 | | |
| 5. DRAWING UNITS: METRIC, mm | MD-439180 | | |
| | MATERIAL | | |
| | NIOBIUM-TITANIUM 55* | | |

| | | | |
|---|--------------------------------------|---------------------------------|-----|
| FERMI NATIONAL ACCELERATOR LABORATORY UNITED STATES DEPARTMENT OF ENERGY | | | |
| DESIGN 1.3GHZ TESLA RF CAVITY NW 78 END TUBE FLANGE | | | |
| SCALE 2:1 | DRAWING NUMBER 4904.010-MD-439159 | SHEET 1 OF 1 | REV |
| CREATED WITH : Ideas11NXSeries | | GROUP: ACCELERATOR MECH. SUPPT. | |


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PURPOSES WITHIN THE USA AND IS TO BE USED
EXCLUSIVELY WITHIN FERMILAB. USAGE OUTSIDE OF
FERMILAB MUST BE APPROVED BY DESY.

| REV | DESCRIPTION | DRAWN | DATE |
|-----|-------------|----------|------|
| | | APPROVED | DATE |

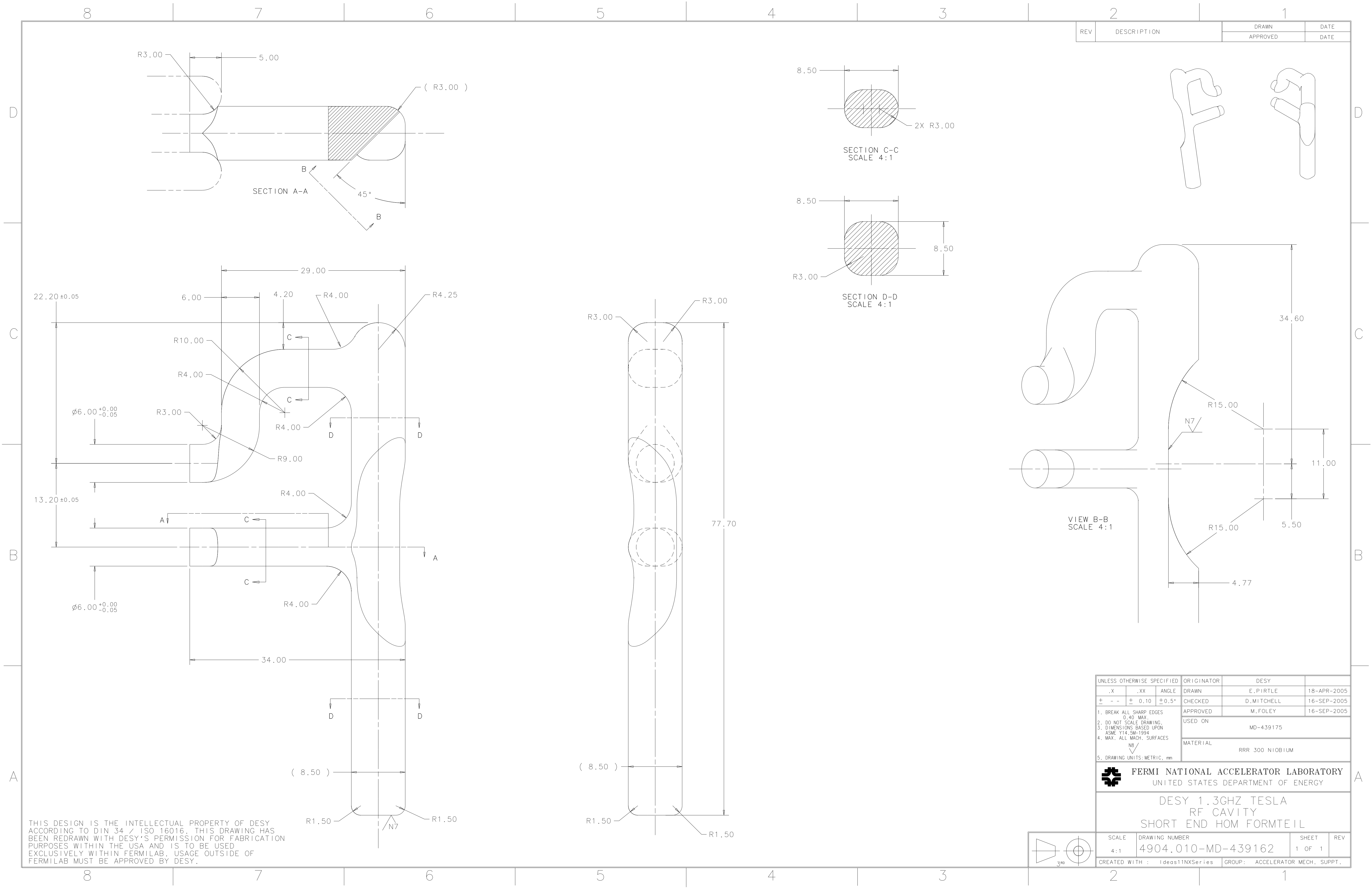


- NOTES:
- 1) DIMENSION COORESponds WITH PART NUMBER MD-439159. TOLERANCE IS TO BE COORDINATED BETWEEN MANUFACTURERS AND EB-WELDERS
 - 2) FINAL LENGTH AFTER MACHINING OPERATION DETAILED IN FUTURE STEP
 - 3) SUPPLEMENT FOR WELD SHRINKAGE TO BE DETERMINED BY EB-WELDERS

| UNLESS OTHERWISE SPECIFIED | | | ORIGINATOR | DESY | |
|---|--------|--------|-----------------------------|------------|-------------|
| .X | .XX | ANGLE | DRAWN | E.PIRTLE | 18-APR-2005 |
| ± 0.2 | ± 0.10 | ± 0.5° | CHECKED | D.MITCHELL | 16-SEP-2005 |
| 1. BREAK ALL SHARP EDGES 0.40 MAX 2. DO NOT SCALE DRAWING 3. DIMENSIONS BASED UPON ASME Y14.5M-1994 4. MAX. ALL MACH. SURFACES N7 5. DRAWING UNITS: METRIC, mm | | | APPROVED | M.FOLEY | 16-SEP-2005 |
| | | | USED ON MD-439177 | | |
| | | | MATERIAL RRR 300 NIOBIUM | | |

| | | | | |
|--|--------------------------------------|---------------------------------|-----------------|-----|
|  FERMILAB NATIONAL ACCELERATOR LABORATORY UNITED STATES DEPARTMENT OF ENERGY | | | | |
| DESY 1.3GHZ TESLA RF CAVITY SHORT END TUBE | | | | |
| SCALE 2:1 | DRAWING NUMBER 4904.010-MD-439161 | | SHEET 1 OF 1 | REV |
| CREATED WITH : Ideas11NXSeries | | GROUP: ACCELERATOR MECH. SUPPT. | | |

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FERMILAB MUST BE APPROVED BY DESY.



D

C

B

A


D

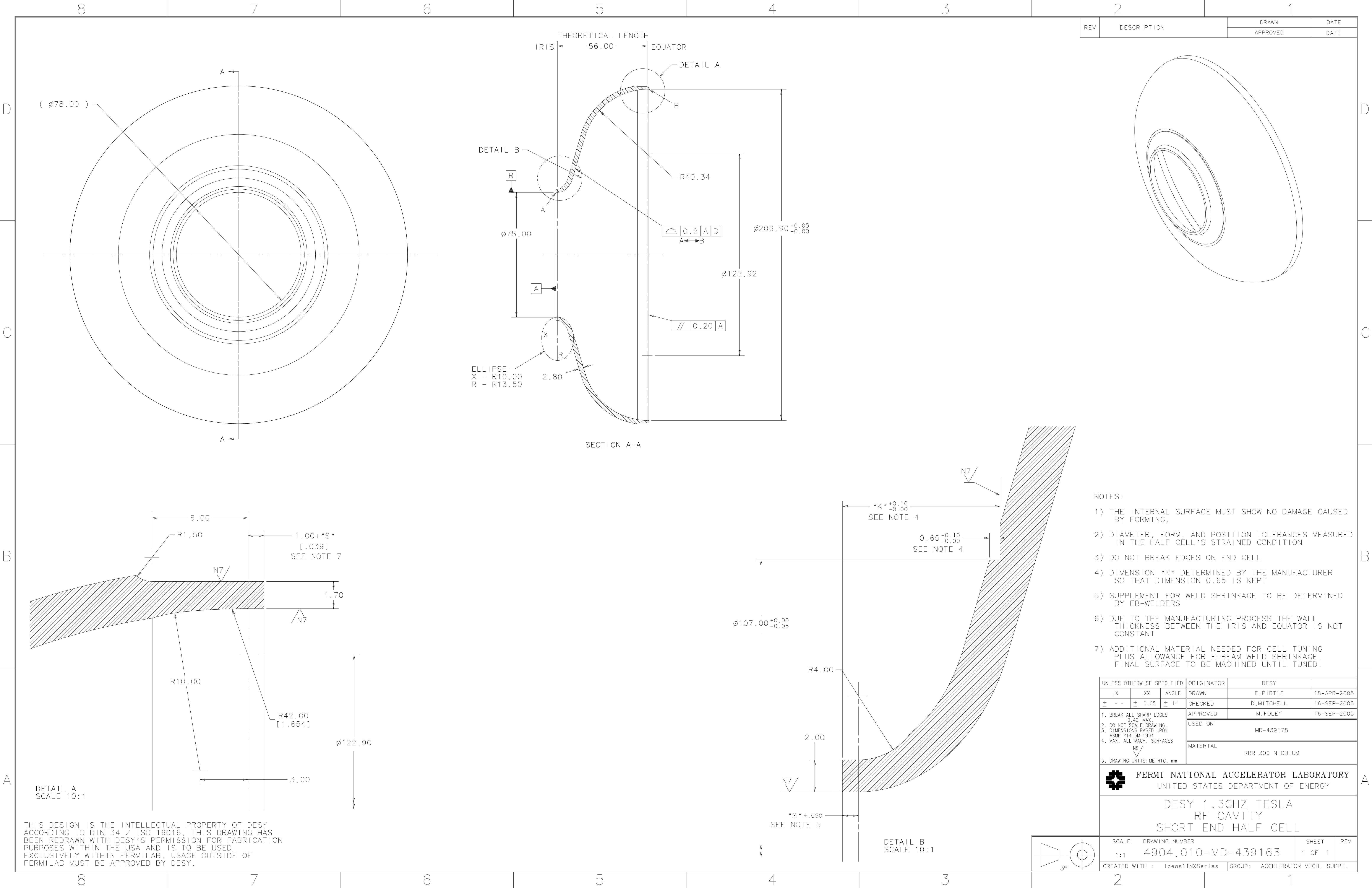
C

B

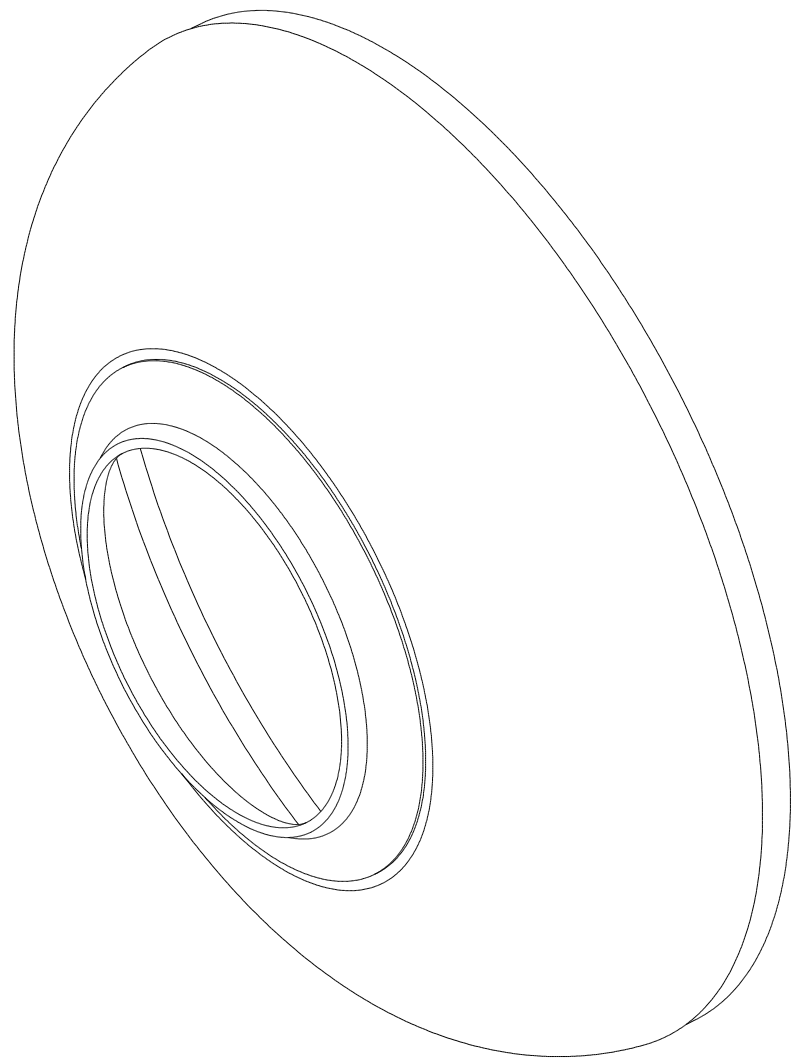
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THIS DESIGN IS THE INTELLECTUAL PROPERTY OF DESY
ACCORDING TO DIN 34 / ISO 16016, THIS DRAWING HAS
BEEN REDRAWN WITH DESY'S PERMISSION FOR FABRICATION
PURPOSES WITHIN THE USA AND IS TO BE USED
EXCLUSIVELY WITHIN FERMILAB. USAGE OUTSIDE OF
FERMILAB MUST BE APPROVED BY DESY.

| | | | | | | | |
|---|--------------------------------------|--------|---------------------------------|----------|-----------------|-------------|--|
| UNLESS OTHERWISE SPECIFIED | | | ORIGINATOR | | DESY | | |
| .X | .XX | ANGLE | DRAWN | E.PIRTLE | 18-APR-2005 | | |
| ± | - - | ± 0.10 | ± 0.5° | CHECKED | D.MITCHELL | 16-SEP-2005 | |
| 1. BREAK ALL SHARP EDGES 0.40 MAX. 2. DO NOT SCALE DRAWING. 3. DIMENSIONS BASED UPON ASME Y14.5M-1994 4. MAX. ALL MACH. SURFACES 5. DRAWING UNITS: METRIC, mm | | | APPROVED | M.FOLEY | 16-SEP-2005 | | |
| | | | USED ON MD-439175 | | | | |
| | | | MATERIAL RRR 300 NIOBIUM | | | | |
|  FERMIONATIONAL ACCELERATOR LABORATORY UNITED STATES DEPARTMENT OF ENERGY | | | | | | | |
| DESY 1.3GHZ TESLA RF CAVITY SHORT END HOM FORMTEIL | | | | | | | |
| SCALE 4:1 | DRAWING NUMBER 4904.010-MD-439162 | | | | SHEET 1 OF 1 | REV | |
| CREATED WITH : Ideas11NXSeries | | | GROUP: ACCELERATOR MECH. SUPPT. | | | | |



| REV | DESCRIPTION | DRAWN | DATE |
|-----|-------------|----------|------|
| | | APPROVED | DATE |



- NOTES:
- 1) THE INTERNAL SURFACE MUST SHOW NO DAMAGE CAUSED BY FORMING.
 - 2) DIAMETER, FORM, AND POSITION TOLERANCES MEASURED IN THE HALF CELL'S STRAINED CONDITION
 - 3) DO NOT BREAK EDGES ON END CELL
 - 4) DIMENSION "K" DETERMINED BY THE MANUFACTURER SO THAT DIMENSION 0.65 IS KEPT
 - 5) SUPPLEMENT FOR WELD SHRINKAGE TO BE DETERMINED BY EB-WELDERS
 - 6) DUE TO THE MANUFACTURING PROCESS THE WALL THICKNESS BETWEEN THE IRIS AND EQUATOR IS NOT CONSTANT
 - 7) ADDITIONAL MATERIAL NEEDED FOR CELL TUNING PLUS ALLOWANCE FOR E-BEAM WELD SHRINKAGE. FINAL SURFACE TO BE MACHINED UNTIL TUNED.

| UNLESS OTHERWISE SPECIFIED | | | ORIGINATOR | DESY | |
|--|-----|-------------|-----------------------------|------------|-------------|
| .X | .XX | ANGLE | DRAWN | E.PIRTLE | 18-APR-2005 |
| ± | - - | ± 0.05 ± 1° | CHECKED | D.MITCHELL | 16-SEP-2005 |
| 1. BREAK ALL SHARP EDGES 0.40 MAX 2. DO NOT SCALE DRAWING. 3. DIMENSIONS BASED UPON ASME Y14.5M-1994 4. MAX. ALL MACH. SURFACES 5. DRAWING UNITS: METRIC, mm | | | APPROVED | M.FOLEY | 16-SEP-2005 |
| | | | USED ON MD-439178 | | |
| | | | MATERIAL RRR 300 NIOBIUM | | |

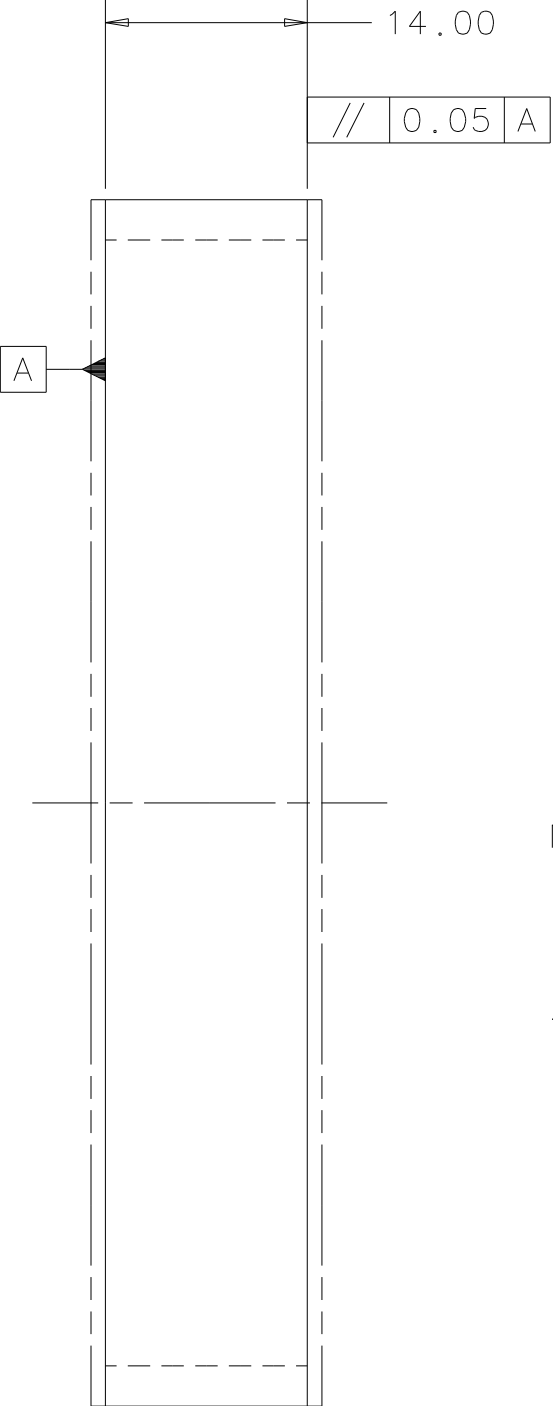
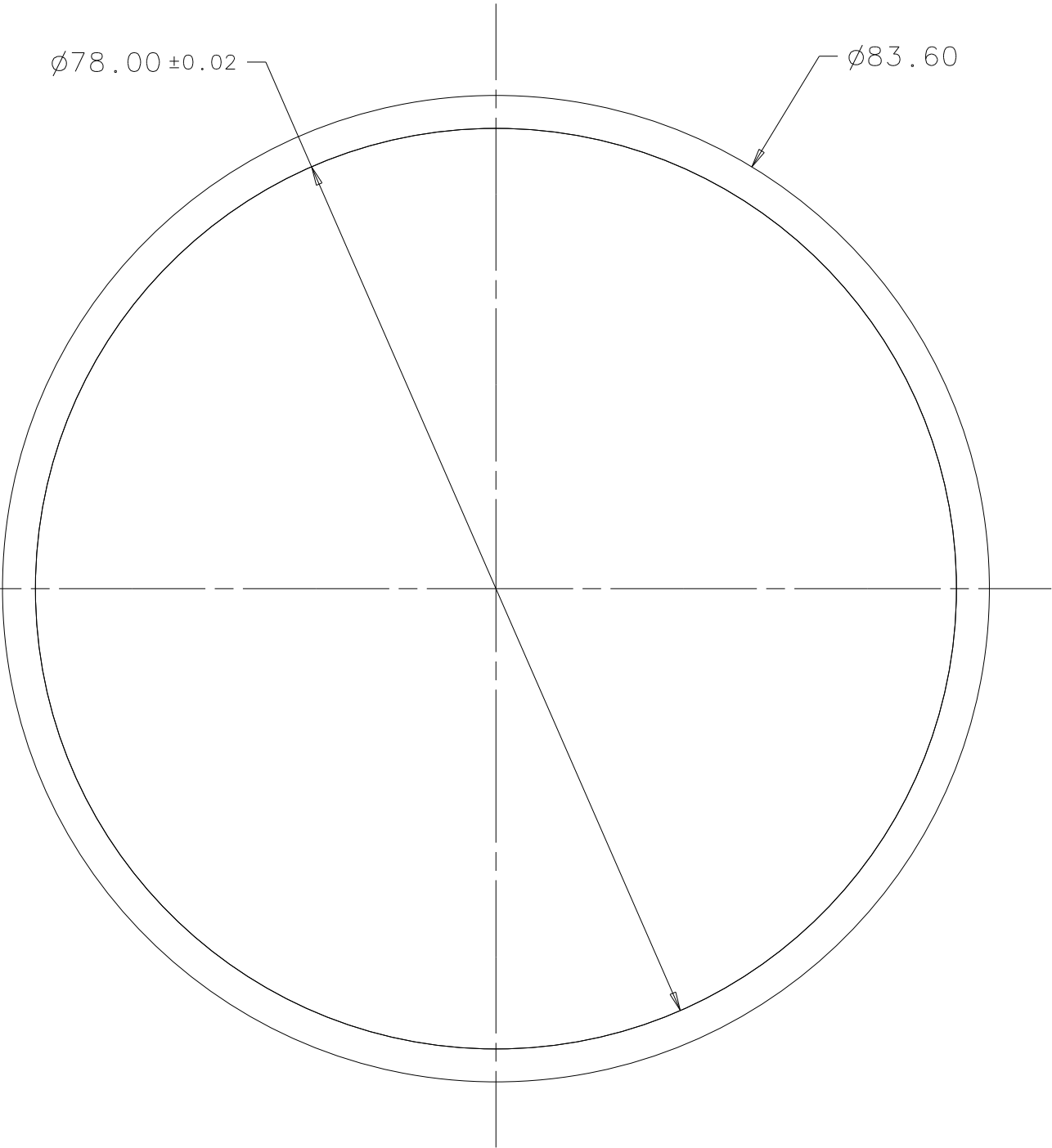
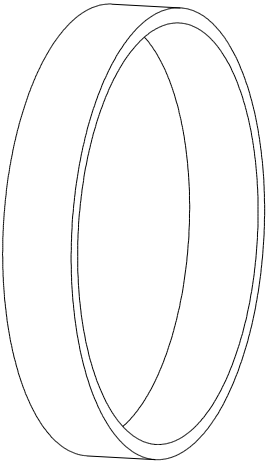
FERMI NATIONAL ACCELERATOR LABORATORY
UNITED STATES DEPARTMENT OF ENERGY

DESY 1.3GHZ TESLA
RF CAVITY
SHORT END HALF CELL

| SCALE | DRAWING NUMBER | SHEET | REV |
|--------------------------------|--------------------|---------------------------------|-----|
| 1:1 | 4904.010-MD-439163 | 1 OF 1 | |
| CREATED WITH : Ideas11NXSeries | | GROUP: ACCELERATOR MECH. SUPPT. | |

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FERMILAB MUST BE APPROVED BY DESY.

| REV | DESCRIPTION | DRAWN | DATE |
|-----|-------------|----------|------|
| | | APPROVED | DATE |

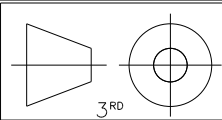


- NOTE :
- 1) SEALING SURFACE MUST BE FREE OF SCRATCHES WITH NO RADIAL SCORING
 - 2) SUPPLEMENT FOR WELD SHRINKAGE TO BE DETERMINED BY E-BEAM WELDERS

| UNLESS OTHERWISE SPECIFIED | | | ORIGINATOR | DESY | |
|---|-----|--------|-----------------------------|------------|-------------|
| .X | .XX | ANGLE | DRAWN | E.PIRTLE | 18-APR-2005 |
| ± | - - | ± 0.20 | CHECKED | D.MITCHELL | 16-SEP-2005 |
| 1. BREAK ALL SHARP EDGES 0.40 MAX. 2. DO NOT SCALE DRAWING. 3. DIMENSIONS BASED UPON ASME Y14.5M-1994 4. MAX. ALL MACH. SURFACES NB 5. DRAWING UNITS: METRIC, mm | | | APPROVED | M.FOLEY | 16-SEP-2005 |
| | | | USED ON MD-439178 | | |
| | | | MATERIAL RRR 300 NIOBIUM | | |

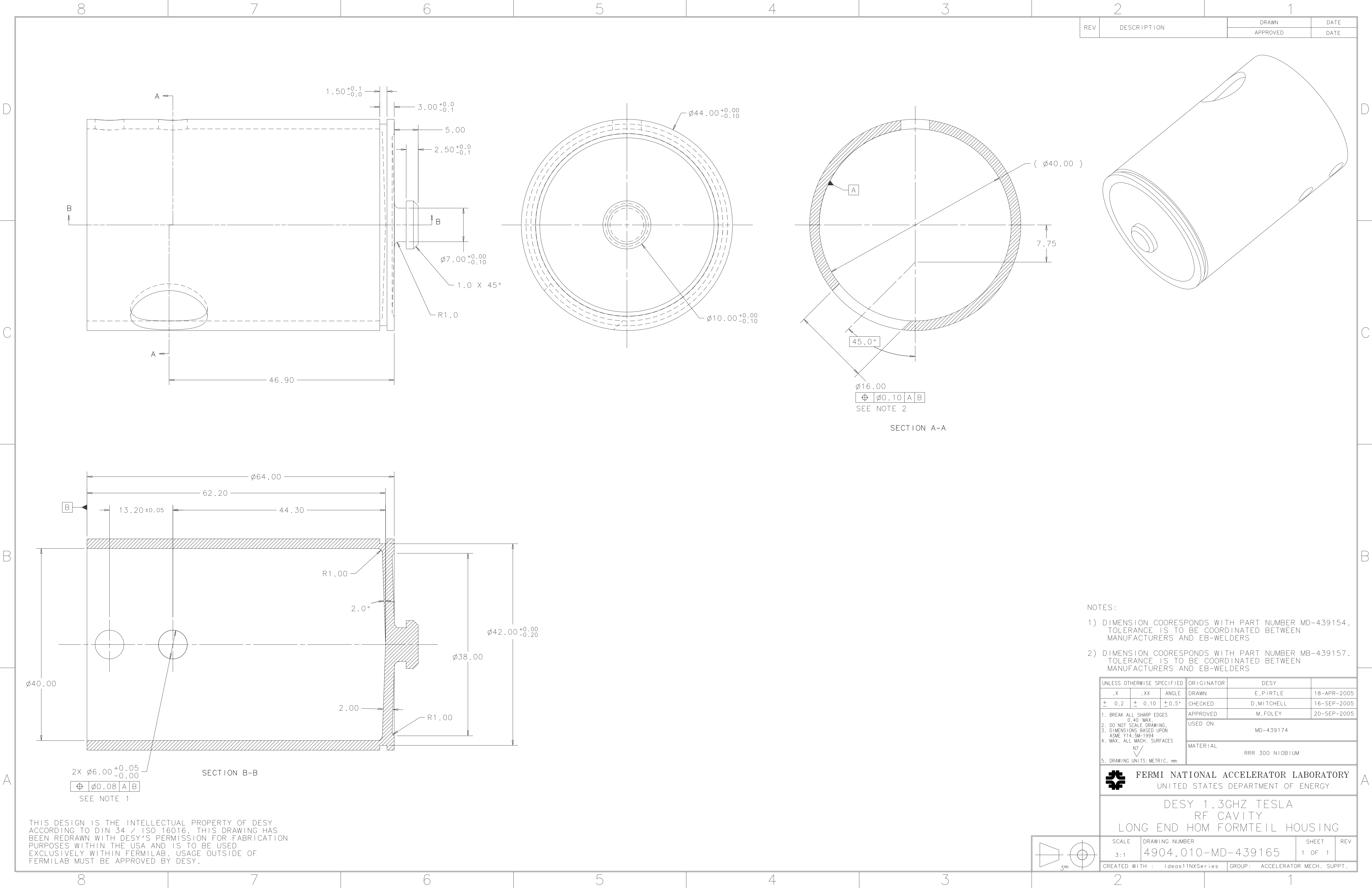
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UNITED STATES DEPARTMENT OF ENERGY

DESY 1.3GHZ TESLA
RF CAVITY
END TUBE SPOOL PIECE



| SCALE | DRAWING NUMBER | SHEET | REV |
|--|--------------------|--------|-----|
| 2:1 | 4904.010-MB-439164 | 1 OF 1 | |
| CREATED WITH : Ideas11NXSeries GROUP: ACCELERATOR MECH. SUPPT. | | | |

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FERMILAB MUST BE APPROVED BY DESY.



| REV | DESCRIPTION | DRAWN | DATE |
|-----|-------------|----------|------|
| | | APPROVED | DATE |

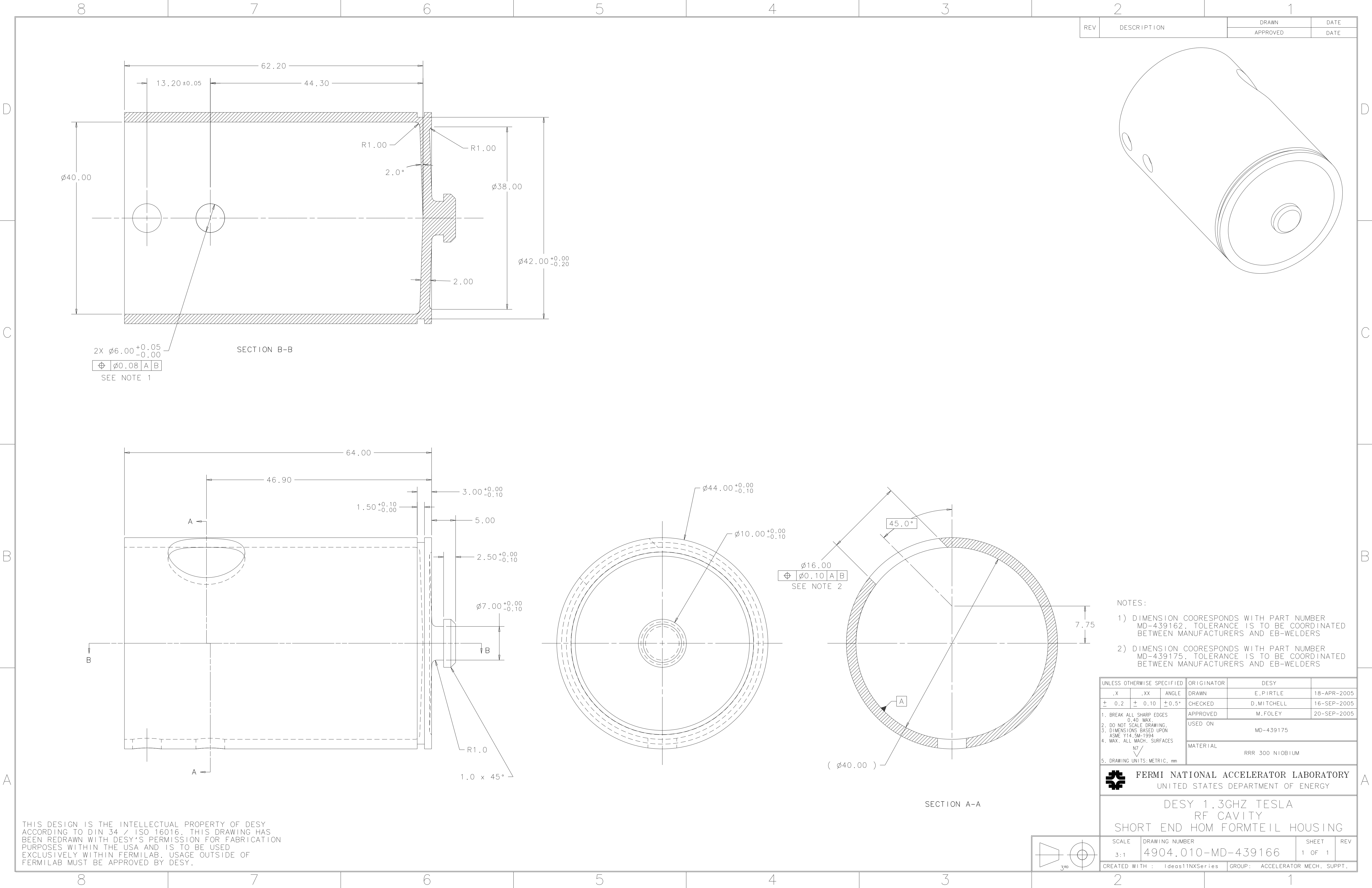
- NOTES:
- 1) DIMENSION COORESponds WITH PART NUMBER MD-439154. TOLERANCE IS TO BE COORDINATED BETWEEN MANUFACTURERS AND EB-WELDERS
 - 2) DIMENSION COORESponds WITH PART NUMBER MB-439157. TOLERANCE IS TO BE COORDINATED BETWEEN MANUFACTURERS AND EB-WELDERS

| UNLESS OTHERWISE SPECIFIED | | | ORIGINATOR | DESY | |
|--|--------|--------|-----------------------------|------------|-------------|
| .X | .XX | ANGLE | DRAWN | E.PIRTLE | 18-APR-2005 |
| ± 0.2 | ± 0.10 | ± 0.5° | CHECKED | D.MITCHELL | 16-SEP-2005 |
| 1. BREAK ALL SHARP EDGES 2. DO NOT SCALE DRAWING. 3. DIMENSIONS BASED UPON ASME Y14.5M-1994 4. MAX. ALL MACH. SURFACES 5. DRAWING UNITS: METRIC, mm | | | APPROVED | M.FOLEY | 20-SEP-2005 |
| | | | USED ON MD-439174 | | |
| | | | MATERIAL RRR 300 NIOBIUM | | |

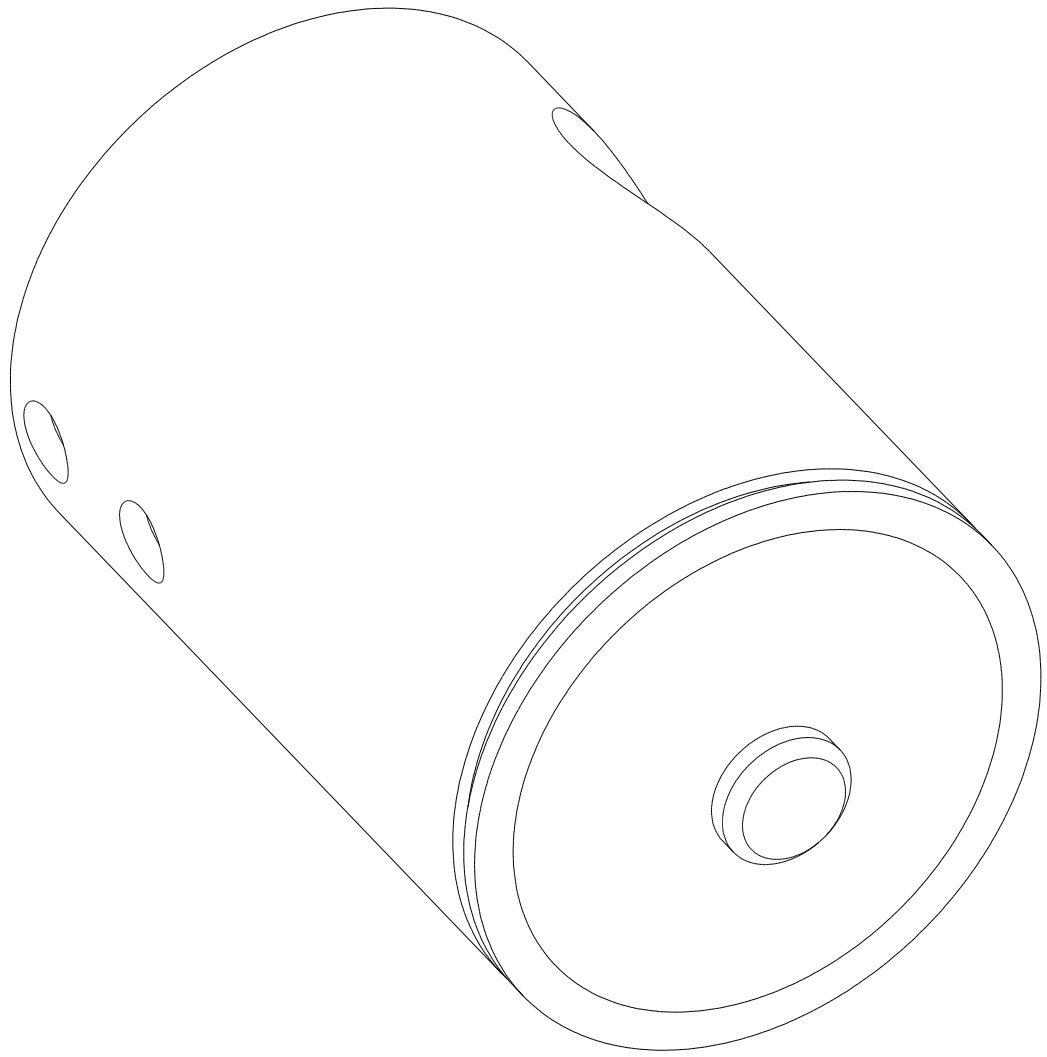
FERMI NATIONAL ACCELERATOR LABORATORY
UNITED STATES DEPARTMENT OF ENERGY

DESY 1.3GHZ TESLA
RF CAVITY
LONG END HOM FORMTEIL HOUSING

| SCALE | DRAWING NUMBER | SHEET | REV |
|--------------------------------|--------------------|---------------------------------|-----|
| 3:1 | 4904.010-MD-439165 | 1 OF 1 | |
| CREATED WITH : Ideos11NXSeries | | GROUP: ACCELERATOR MECH. SUPPT. | |

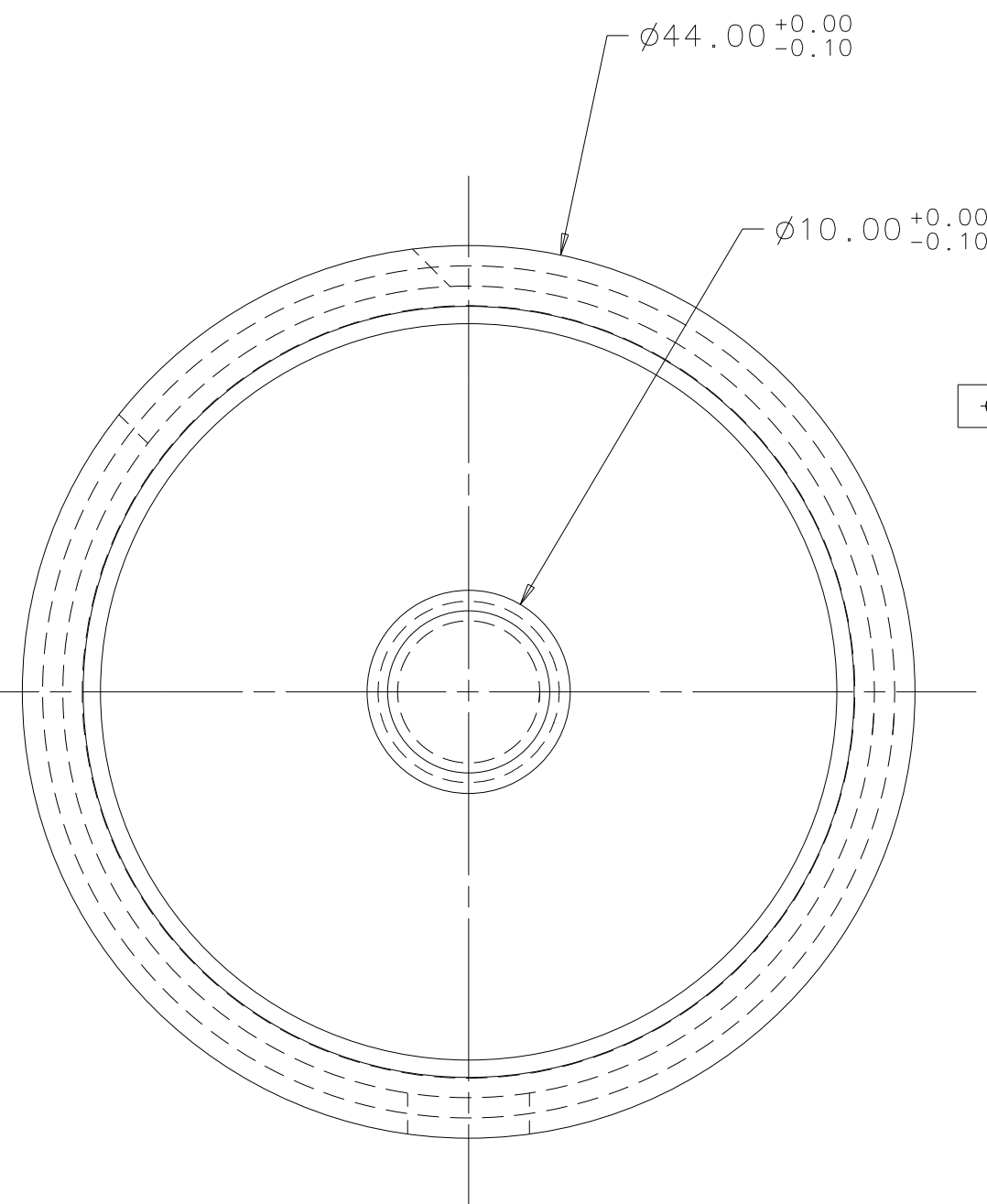
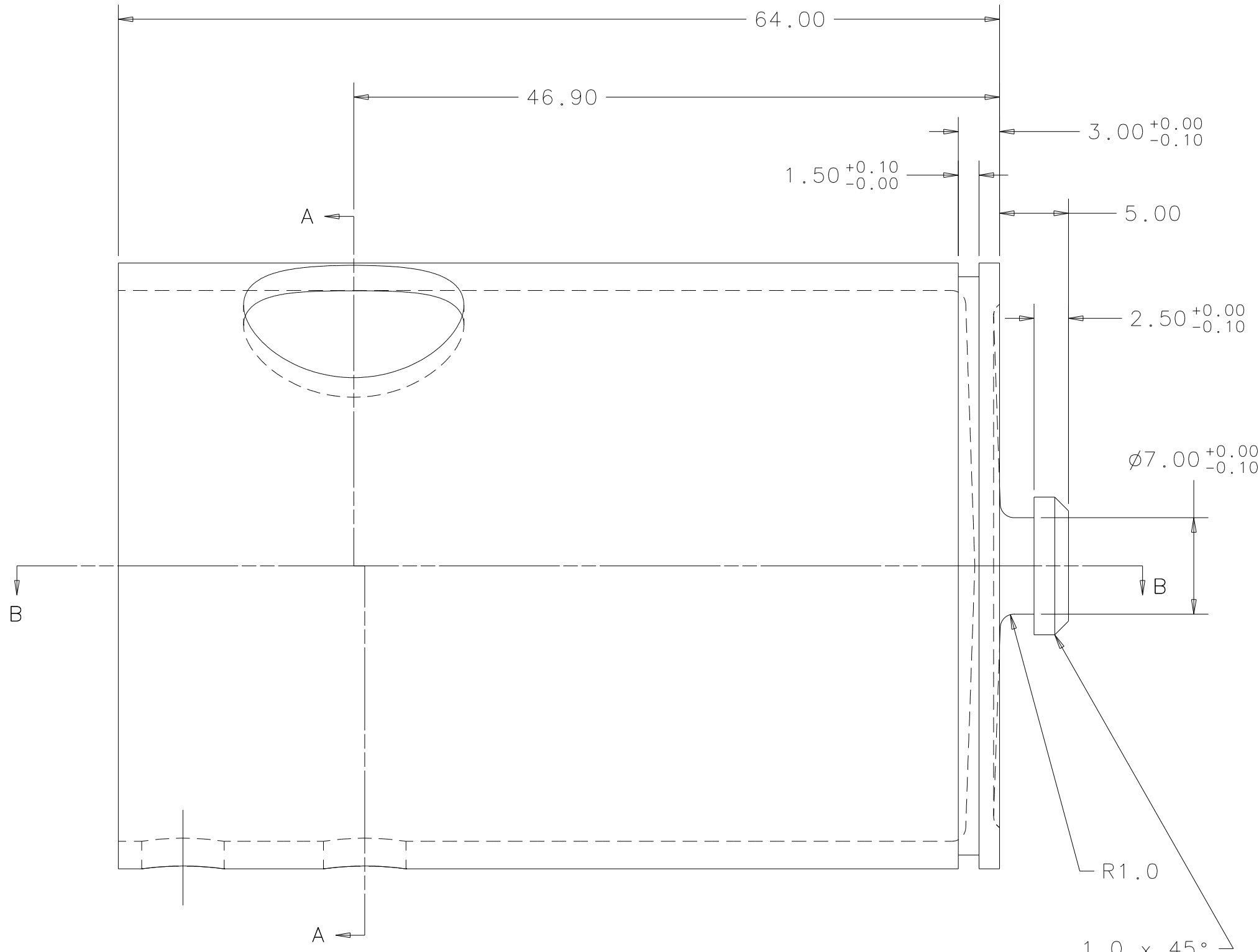


| REV | DESCRIPTION | DRAWN | DATE |
|-----|-------------|----------|------|
| | | APPROVED | DATE |

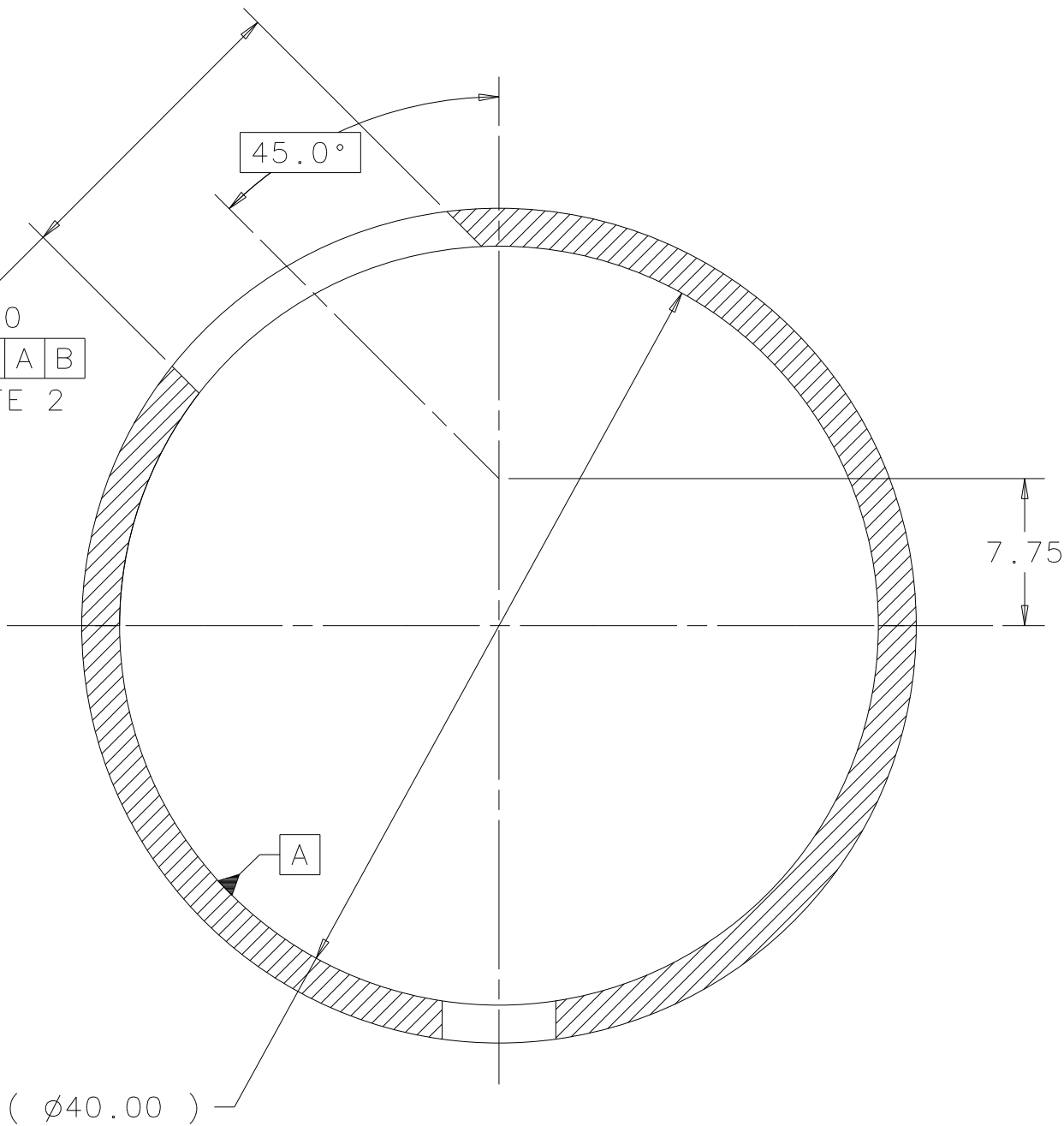


2X $\phi 6.00^{+0.05}_{-0.00}$
 $\phi 0.08$ A B
SEE NOTE 1

SECTION B-B



$\phi 16.00$
 $\phi 0.10$ A B
SEE NOTE 2



SECTION A-A

- NOTES:
- 1) DIMENSION COORESPONDS WITH PART NUMBER MD-439162. TOLERANCE IS TO BE COORDINATED BETWEEN MANUFACTURERS AND EB-WELDERS
 - 2) DIMENSION COORESPONDS WITH PART NUMBER MD-439175. TOLERANCE IS TO BE COORDINATED BETWEEN MANUFACTURERS AND EB-WELDERS

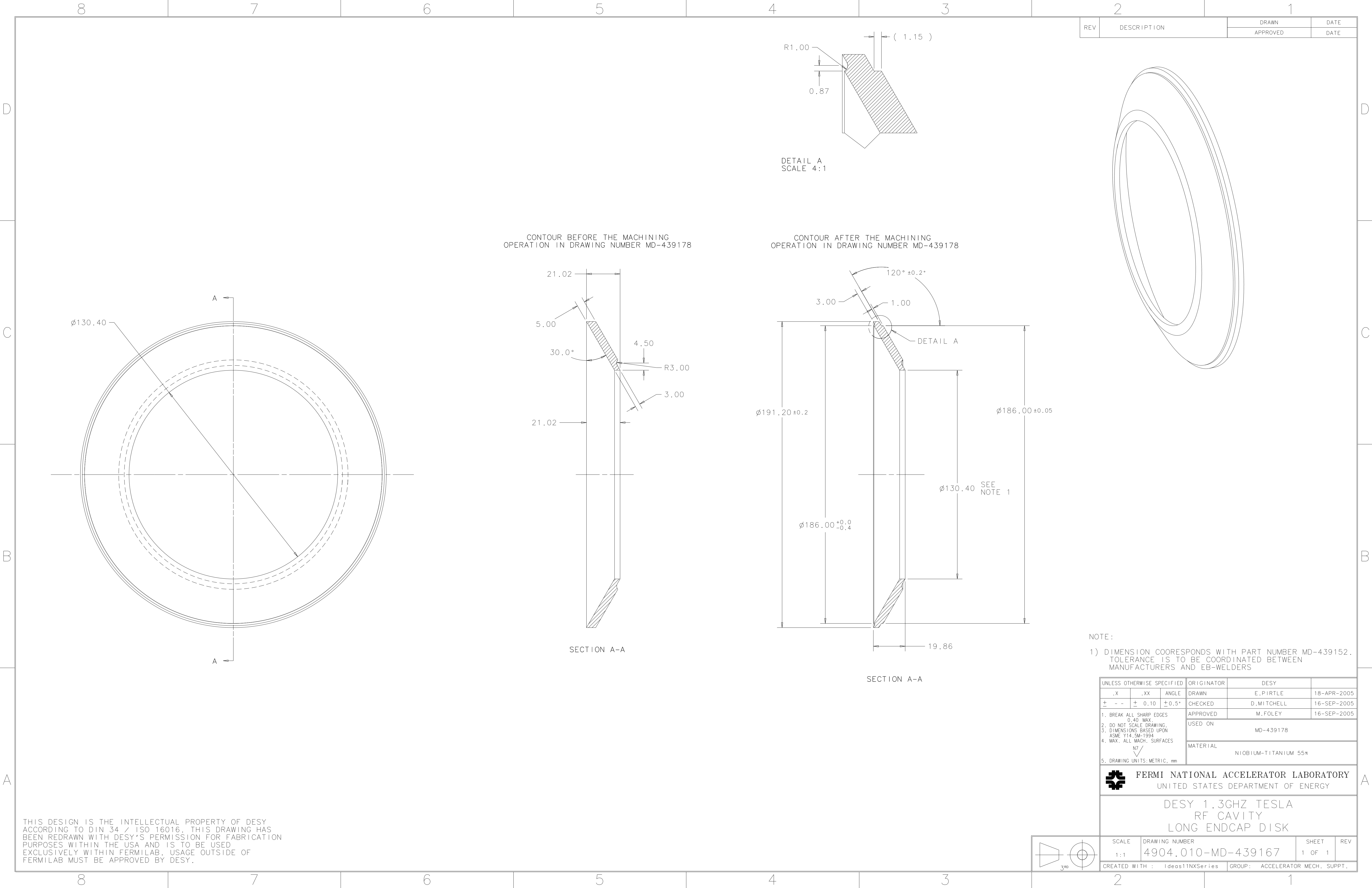
| UNLESS OTHERWISE SPECIFIED | | | ORIGINATOR | DESY | |
|--|--------|--------|-----------------------------|------------|-------------|
| .X | .XX | ANGLE | DRAWN | E.PIRTLE | 18-APR-2005 |
| ± 0.2 | ± 0.10 | ± 0.5° | CHECKED | D.MITCHELL | 16-SEP-2005 |
| 1. BREAK ALL SHARP EDGES 0.40 MAX 2. DO NOT SCALE DRAWING. 3. DIMENSIONS BASED UPON ASME Y14.5M-1994 4. MAX. ALL MACH. SURFACES N7 5. DRAWING UNITS: METRIC, mm | | | APPROVED | M.FOLEY | 20-SEP-2005 |
| | | | USED ON MD-439175 | | |
| | | | MATERIAL RRR 300 NIOBIUM | | |

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UNITED STATES DEPARTMENT OF ENERGY

DESY 1.3GHZ TESLA
RF CAVITY
SHORT END HOM FORMTEIL HOUSING

| SCALE | DRAWING NUMBER | SHEET | REV |
|--------------------------------|--------------------|---------------------------------|-----|
| 3:1 | 4904.010-MD-439166 | 1 OF 1 | |
| CREATED WITH : Ideas11NXSeries | | GROUP: ACCELERATOR MECH. SUPPT. | |

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CONTOUR BEFORE THE MACHINING
OPERATION IN DRAWING NUMBER MD-439178

CONTOUR AFTER THE MACHINING
OPERATION IN DRAWING NUMBER MD-439178

NOTE:
1) DIMENSION COORESponds WITH PART NUMBER MD-439152.
TOLERANCE IS TO BE COORDINATED BETWEEN
MANUFACTURERS AND EB-WELDERS

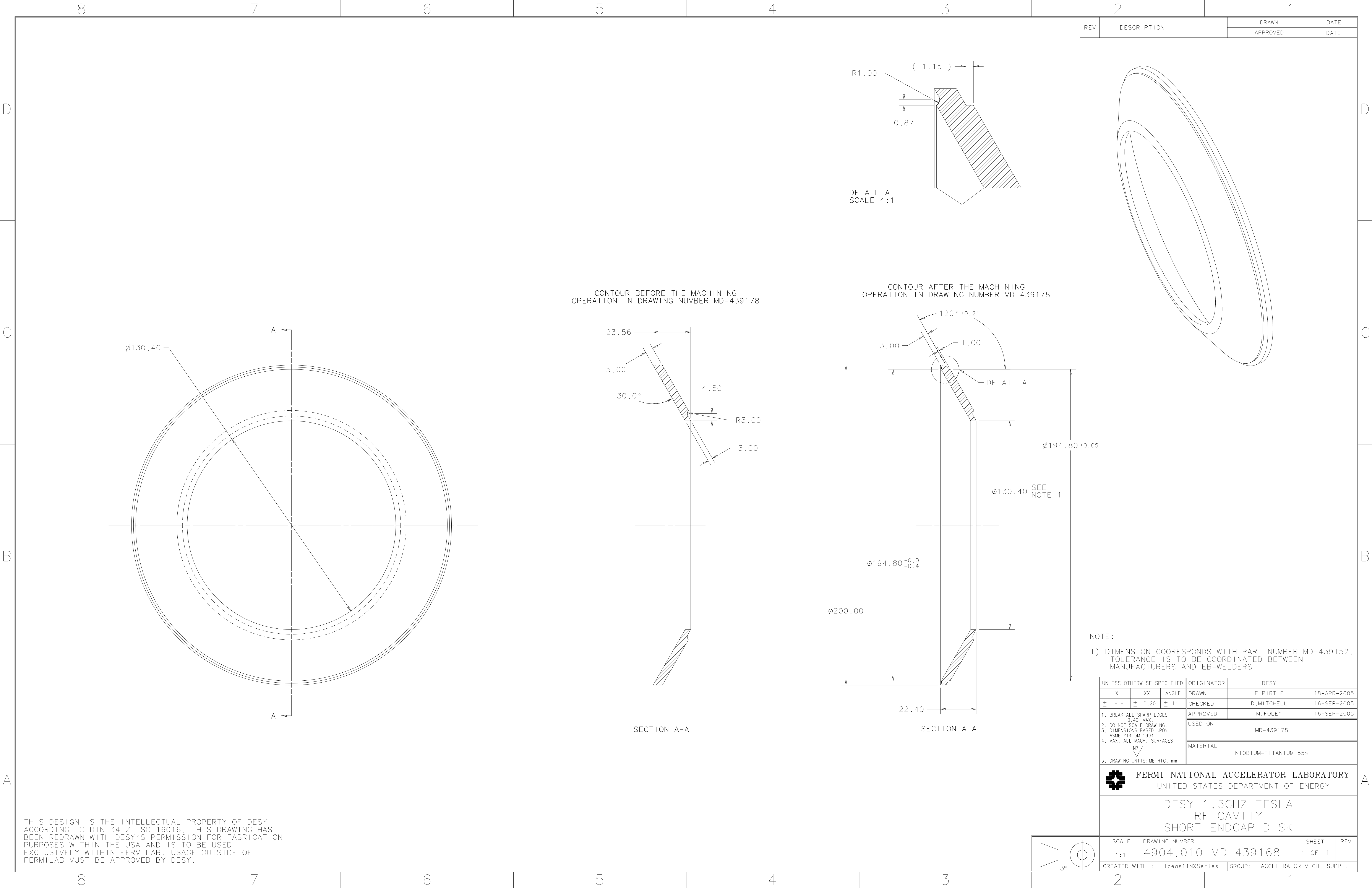
| UNLESS OTHERWISE SPECIFIED | | | ORIGINATOR | DESY | |
|--|-----|--------|----------------------|------------|-------------|
| .X | .XX | ANGLE | DRAWN | E.PIRTLE | 18-APR-2005 |
| ± | - - | ± 0.10 | CHECKED | D.MITCHELL | 16-SEP-2005 |
| 1. BREAK ALL SHARP EDGES 0.40 MAX | | | APPROVED | M.FOLEY | 16-SEP-2005 |
| 2. DO NOT SCALE DRAWING. | | | USED ON | | |
| 3. DIMENSIONS BASED UPON ASME Y14.5M-1994 | | | MD-439178 | | |
| 4. MAX. ALL MACH. SURFACES | | | MATERIAL | | |
| 5. DRAWING UNITS: METRIC, mm | | | NIOBIUM-TITANIUM 55% | | |

FERMI NATIONAL ACCELERATOR LABORATORY
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DESY 1.3GHZ TESLA
RF CAVITY
LONG ENDCAP DISK

| | | | |
|--------------------------------|--------------------------------------|---------------------------------|-----|
| SCALE 1:1 | DRAWING NUMBER 4904.010-MD-439167 | SHEET 1 OF 1 | REV |
| CREATED WITH : Ideos11NXSeries | | GROUP: ACCELERATOR MECH. SUPPT. | |

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FERMILAB MUST BE APPROVED BY DESY.



| REV | DESCRIPTION | DRAWN | DATE |
|-----|-------------|----------|------|
| | | APPROVED | DATE |

NOTE:
1) DIMENSION COORESponds WITH PART NUMBER MD-439152.
TOLERANCE IS TO BE COORDINATED BETWEEN
MANUFACTURERS AND EB-WELDERS

| UNLESS OTHERWISE SPECIFIED | | | ORIGINATOR | DESY | |
|--|-----|-------------|----------------------------------|------------|-------------|
| .X | .XX | ANGLE | DRAWN | E.PIRTLE | 18-APR-2005 |
| ± | - - | ± 0.20 ± 1° | CHECKED | D.MITCHELL | 16-SEP-2005 |
| 1. BREAK ALL SHARP EDGES 0.40 MAX 2. DO NOT SCALE DRAWING. 3. DIMENSIONS BASED UPON ASME Y14.5M-1994 4. MAX. ALL MACH. SURFACES N7 5. DRAWING UNITS: METRIC, mm | | | APPROVED | M.FOLEY | 16-SEP-2005 |
| | | | USED ON MD-439178 | | |
| | | | MATERIAL NIOBIUM-TITANIUM 55% | | |

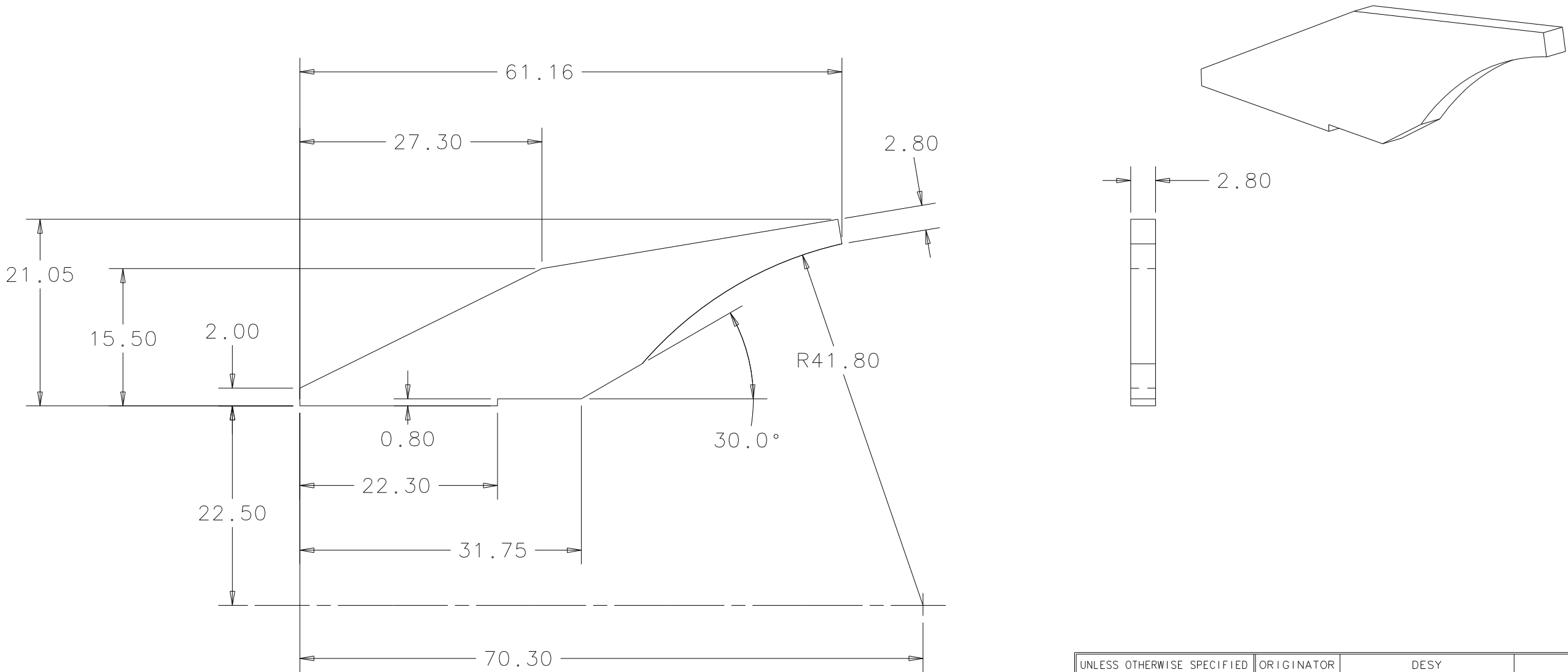
FERMI NATIONAL ACCELERATOR LABORATORY
UNITED STATES DEPARTMENT OF ENERGY

DESY 1.3GHZ TESLA
RF CAVITY
SHORT ENDCAP DISK


| SCALE | DRAWING NUMBER | SHEET | REV |
|--------------------------------|--------------------|---------------------------------|-----|
| 1:1 | 4904.010-MD-439168 | 1 OF 1 | |
| CREATED WITH : Ideos11NXSeries | | GROUP: ACCELERATOR MECH. SUPPT. | |

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EXCLUSIVELY WITHIN FERMILAB. USAGE OUTSIDE OF
FERMILAB MUST BE APPROVED BY DESY.

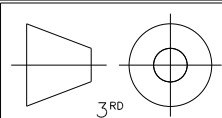
| REV | DESCRIPTION | DRAWN | DATE |
|-----|-------------|----------|------|
| | | APPROVED | DATE |

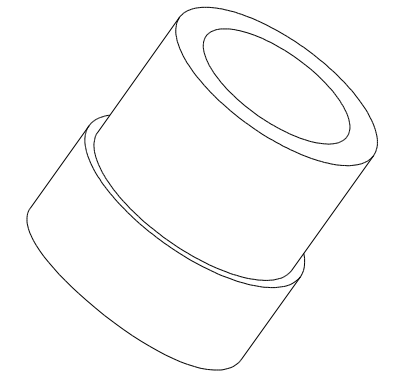
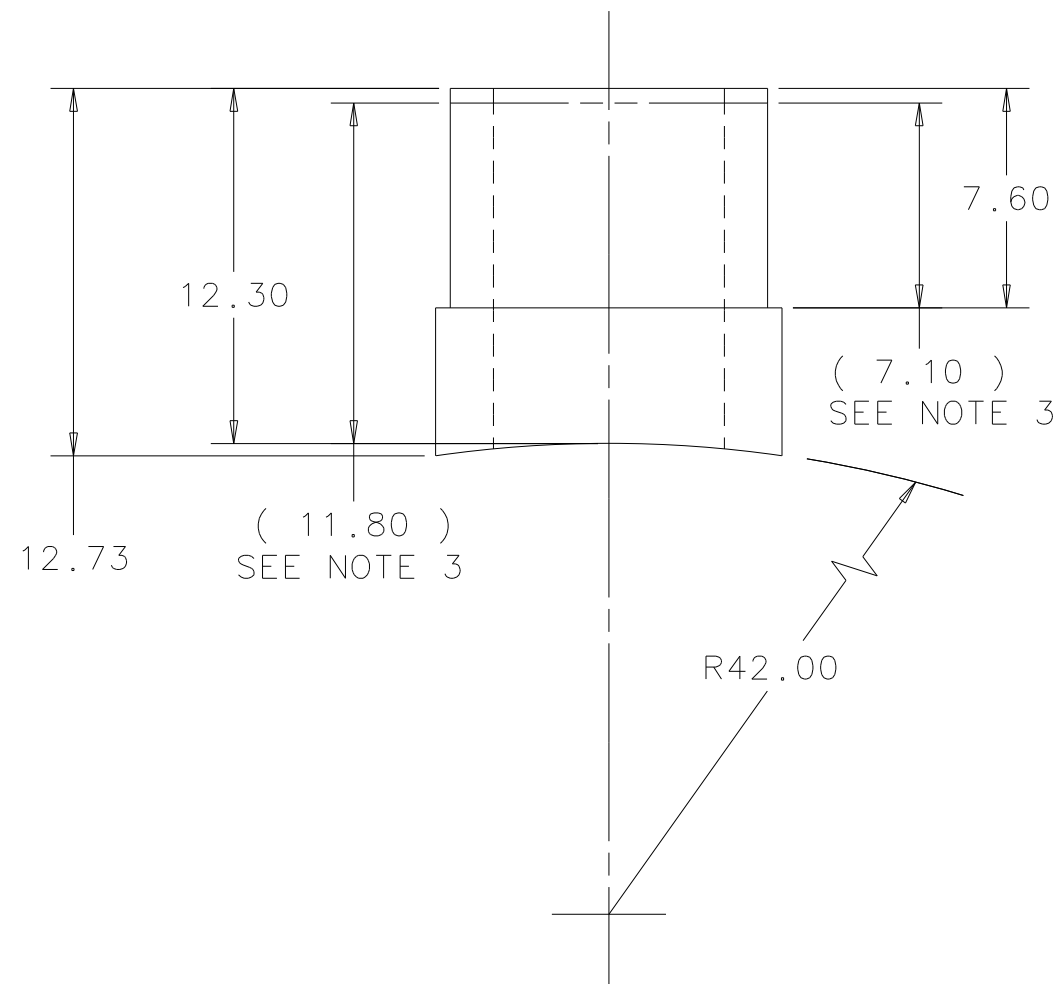
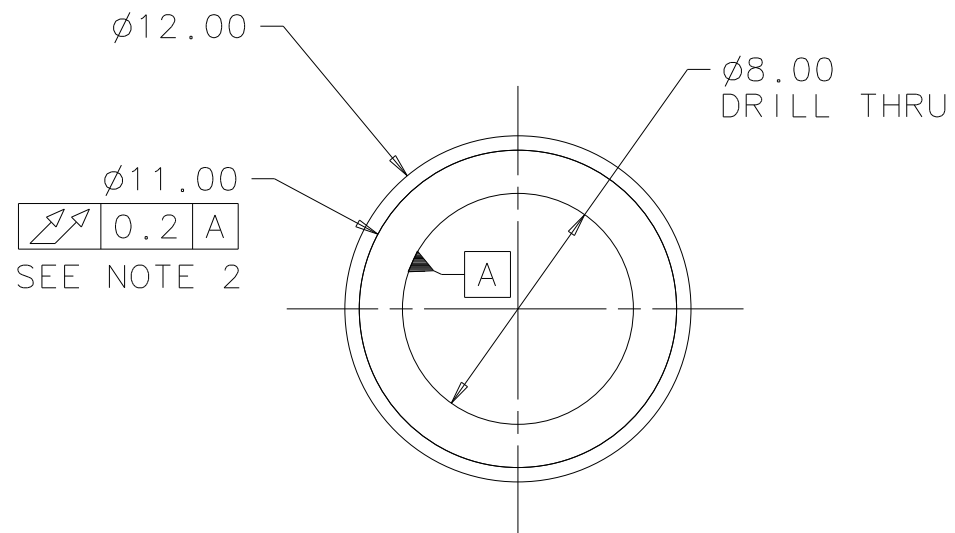


| | | | | | |
|--|-----|-------------|----------------|------------|-------------|
| UNLESS OTHERWISE SPECIFIED | | | ORIGINATOR | DESIGN | |
| .X | .XX | ANGLE | DRAWN | E.PIRTLE | 18-APR-2005 |
| ± | - - | ± 0.20 ± 1° | CHECKED | D.MITCHELL | 16-SEP-2005 |
| 1. BREAK ALL SHARP EDGES 0.40 MAX. 2. DO NOT SCALE DRAWING. 3. DIMENSIONS BASED UPON ASME Y14.5M-1994 4. MAX. ALL MACH. SURFACES N8/ 5. DRAWING UNITS: METRIC, mm | | | APPROVED | M.FOLEY | 16-SEP-2005 |
| | | | USED ON | | |
| | | | MD-439177 | | |
| | | | MATERIAL | | |
| | | | RRR 40 NIOBIUM | | |

| | | | |
|---|--------------------|---------------------------------|-----|
| <div>  <div> FERMI NATIONAL ACCELERATOR LABORATORY UNITED STATES DEPARTMENT OF ENERGY </div> </div> | | | |
| DESY 1.3GHZ TESLA RF CAVITY SHORT END TUBE RIB | | | |
| SCALE | DRAWING NUMBER | SHEET | REV |
| 2:1 | 4904.010-MB-439169 | 1 OF 1 | |
| CREATED WITH : Ideas11NXSeries | | GROUP: ACCELERATOR MECH. SUPPT. | |

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 FERMILAB MUST BE APPROVED BY DESY.





NOTE :

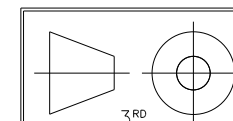
- 1) SURFACE FREE OF DAMAGE
- 2) DIMENSION COORESponds WITH PART NUMBER MB-439160. TOLERANCE IS TO BE COORDINATED BETWEEN MANUFACTURERS AND EB-WELDERS
- 3) FINAL LENGTH AFTER MACHINING OPERATION DETAILED ON DRAWING NUMBER MD-439179

| UNLESS OTHERWISE SPECIFIED | | | ORIGINATOR | DESY | |
|---|-----|-------------|----------------------|------------|-------------|
| .X | .XX | ANGLE | DRAWN | E.PIRTLE | 18-APR-2005 |
| ± | - - | ± 0.20 ± 1° | CHECKED | D.MITCHELL | 16-SEP-2005 |
| 1. BREAK ALL SHARP EDGES 0.40 MAX. 2. DO NOT SCALE DRAWING. 3. DIMENSIONS BASED UPON ASME Y14.5M-1994 4. MAX. ALL MACH. SURFACES NB 5. DRAWING UNITS: METRIC, mm | | | APPROVED | M.FOLEY | 20-SEP-2005 |
| | | | USED ON MD-439176 | | |
| | | | MATERIAL NIOBIUM | | |



FERMI NATIONAL ACCELERATOR LABORATORY
UNITED STATES DEPARTMENT OF ENERGY

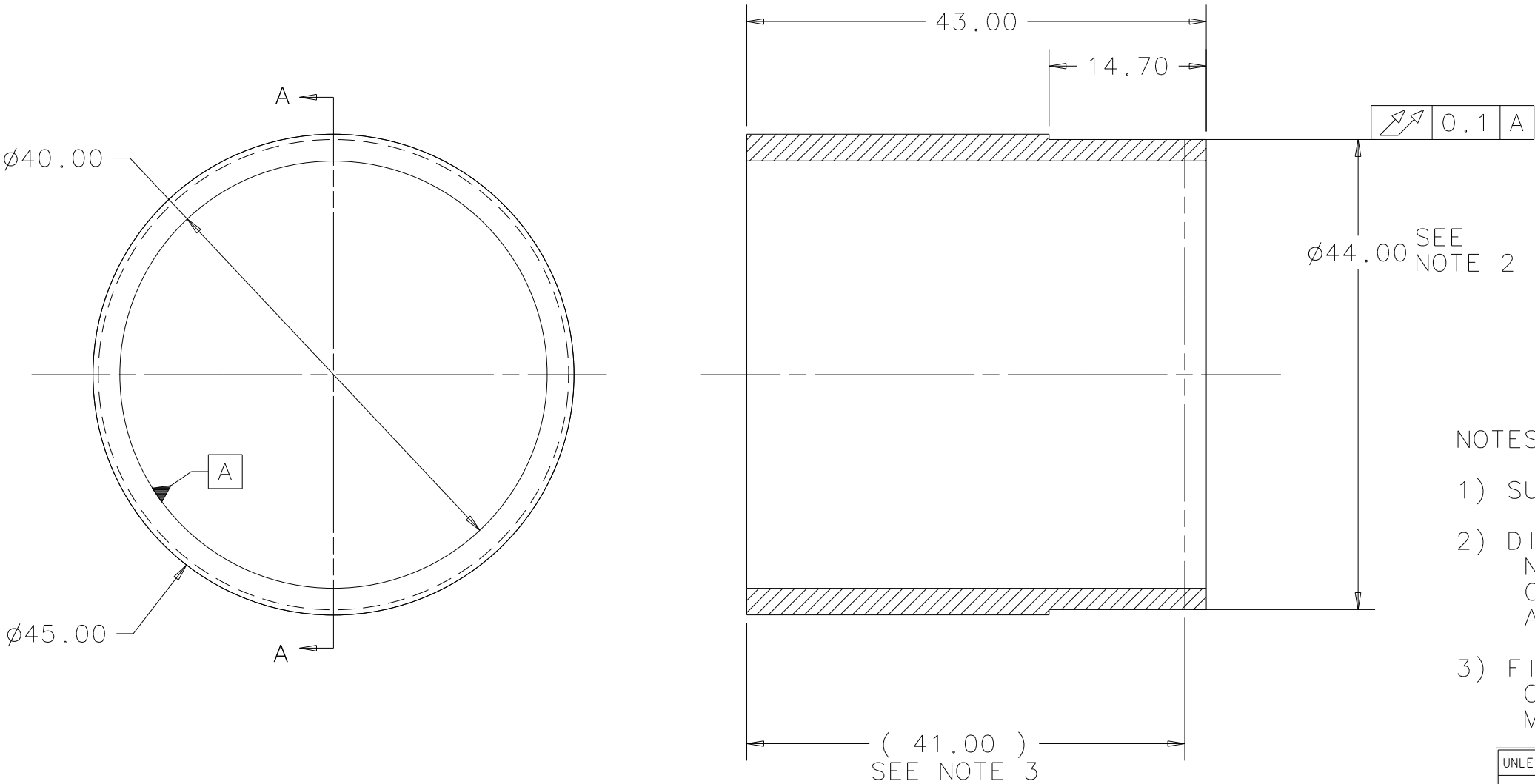
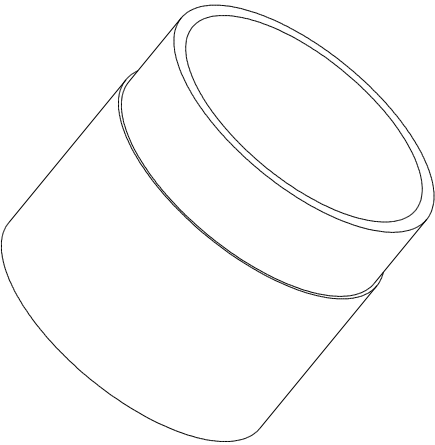
DESY 1.3GHZ TESLA
RF CAVITY
LONG END ANTENNA SPOOL PIECE



| SCALE | DRAWING NUMBER | SHEET | REV |
|--|--------------------|--------|-----|
| 4:1 | 4904.010-MB-439170 | 1 OF 1 | |
| CREATED WITH : Ideas11NXSeries GROUP: ACCELERATOR MECH. SUPPT. | | | |

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| REV | DESCRIPTION | DRAWN | DATE |
|-----|-------------|----------|------|
| | | APPROVED | DATE |



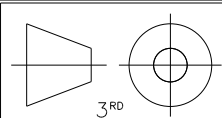
- NOTES:
- 1) SURFACE FREE OF DAMAGE
 - 2) DIMENSION COORESponds WITH PART NUMBER MB-439158. TOLERANCE IS TO BE COORDINATED BETWEEN MANUFACTURERS AND EB-WELDERS
 - 3) FINAL LENGTH AFTER MACHINING OPERATION DETAILED ON DRAWING NUMBER MD-439180

| UNLESS OTHERWISE SPECIFIED | | | ORIGINATOR | DESIGN | |
|---|-----|--------|-----------------|------------|-------------|
| .X | .XX | ANGLE | DRAWN | E.PIRTLE | 18-APR-2005 |
| ± | - - | ± 0.20 | CHECKED | D.MITCHELL | 16-SEP-2005 |
| 1. BREAK ALL SHARP EDGES 0.40 MAX. 2. DO NOT SCALE DRAWING. 3. DIMENSIONS BASED UPON ASME Y14.5M-1994 4. MAX. ALL MACH. SURFACES NB / 5. DRAWING UNITS: METRIC, mm | | | APPROVED | M.FOLEY | 20-SEP-2005 |
| | | | USED ON | | |
| | | | MD-439177 | | |
| | | | MATERIAL | | |
| | | | RRR 300 NIOBIUM | | |



FERMI NATIONAL ACCELERATOR LABORATORY
UNITED STATES DEPARTMENT OF ENERGY

DESIGN 1.3GHZ TESLA
RF CAVITY
COUPLER SPOOL PIECE



| SCALE | DRAWING NUMBER | SHEET | REV |
|--------------------------------|--------------------|---------------------------------|-----|
| 2:1 | 4904.010-MB-439171 | 1 OF 1 | |
| CREATED WITH : Ideas11NXSeries | | GROUP: ACCELERATOR MECH. SUPPT. | |

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EXCLUSIVELY WITHIN FERMILAB. USAGE OUTSIDE OF
FERMILAB MUST BE APPROVED BY DESY.

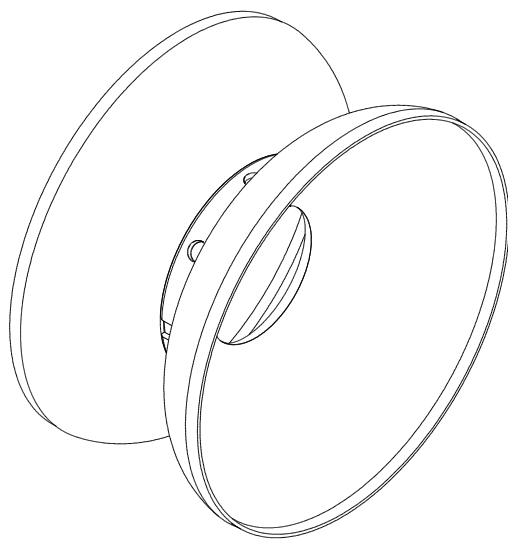
4

3

2

1

| REV | DESCRIPTION | DRAWN | DATE |
|-----|-------------|----------|------|
| | | APPROVED | DATE |



- WELDING NOTES:
- 1) ASSEMBLY TO BE VACUUM TIGHT.
NO LEAK SHALL BE DETECTABLE ON THE MOST SENSITIVE SCALE OF A HELIUM MASS SPECTROMETER LEAK DETECTOR WITH A MINIMUM SENSITIVITY OF 2×10^{-10} ATM-CC/SEC FOR HELIUM.
 - 2) ASSEMBLY TO BE CLEANED, AND PACKAGED SO AS TO ASSURE NO CONTAMINATION FROM FOREIGN MATERIALS, METAL CHIPS OR OTHER CONTAMINATES. CLEANING PROCEDURE TO BE APPROVED BY FERMILAB.
 - 3) ALL DESIGN, ASSEMBLY, AND HANDLING IS TO CONFORM TO STANDARD ULTRA HIGH VACUUM PRACTICES
 - 4) ALL ELECTRON BEAM WELDING, ACID ETCHING, CLEANLINESS, AND HANDLING PROCEDURES ARE DETAILED IN DESY SPECIFICATION MHF-SL 1-1999 AND MUST BE FOLLOWED.

- NOTES:
- 1) RF SURFACES IS TO BE FREE OF DAMAGE
 - 2) ADDITIONAL MATERIAL NEEDED FOR CELL TUNING PLUS ALLOWANCE FOR E-BEAM WELD SHRINKAGE. FINAL SURFACE TO BE MACHINED UNTIL TUNED.
 - 3) ALL PARTS ARE TO BE CONCENTRIC WITHIN $\phi 0.08\text{mm}$ ALONG DATUM A AND B
 - 4) DO NOT BREAK EDGES ON END CELL
 - 5) DUAL PASS WELD -- WELD BOTH SIDES TO ENSURE OVERLAP

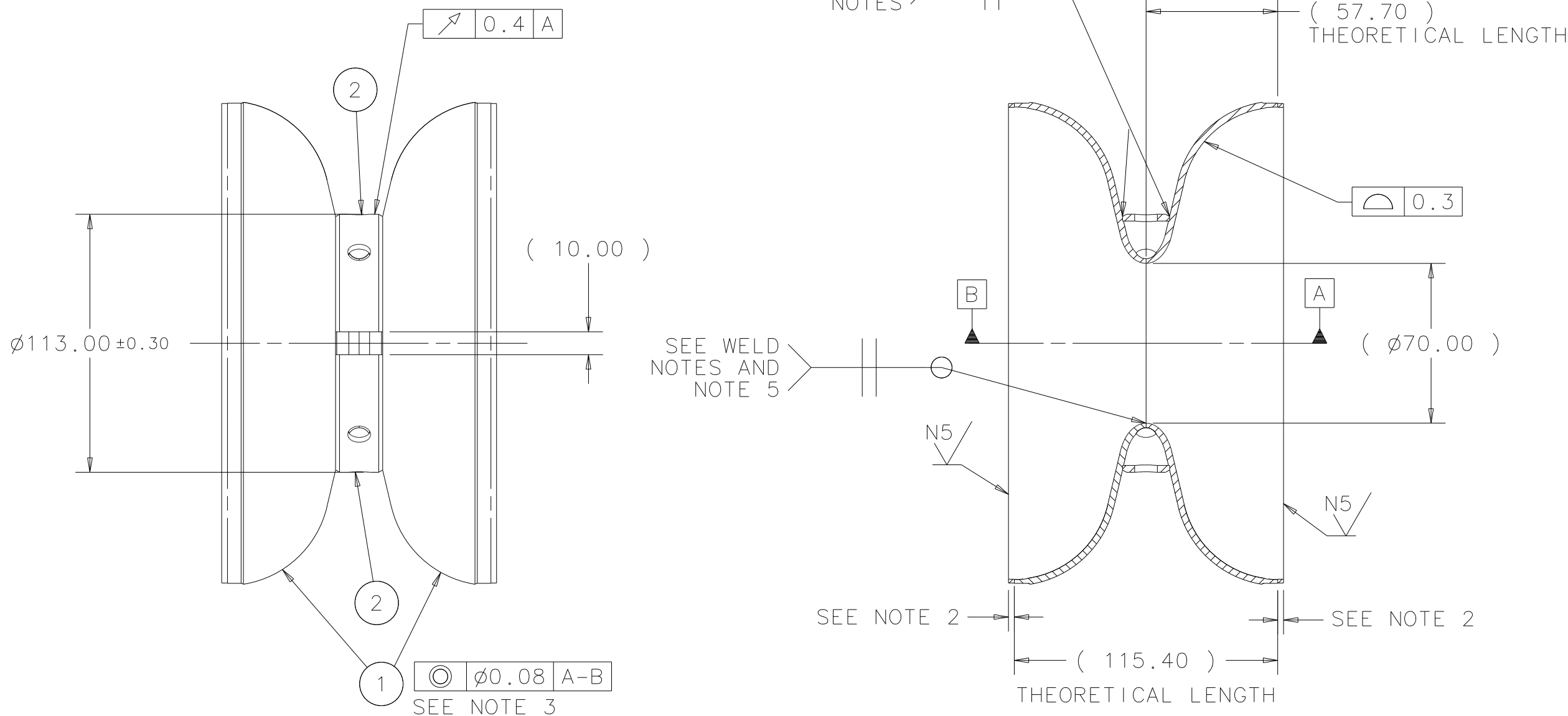
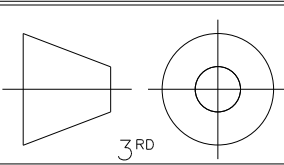
| 2 | MB-439151 | HALF CELL SUPPORT RING HALF | 2 |
|------|-----------|-----------------------------|------|
| 1 | MD-439156 | NORMAL HALF CELL | 2 |
| ITEM | PART NO. | DESCRIPTION OR SIZE | QTY. |

| PARTS LIST | | | | | |
|---|-----|------------|----------------|------------|-------------|
| UNLESS OTHERWISE SPECIFIED | | | ORIGINATOR | DESY | |
| .X | .XX | ANGLE | DRAWN | E.PIRTLE | 18-APR-2005 |
| \pm | -- | ± 0.10 | CHECKED | D.MITCHELL | 16-SEP-2005 |
| 1. BREAK ALL SHARP EDGES 0.40 MAX. | | | APPROVED | M.FOLEY | 20-SEP-2005 |
| 2. DO NOT SCALE DRAWING. | | | USED ON | | |
| 3. DIMENSIONS BASED UPON ASME Y14.5M-1994 | | | MD-439173 | | |
| 4. MAX. ALL MACH. SURFACES N7 | | | MATERIAL | | |
| 5. DRAWING UNITS: METRIC, mm | | | SEE PARTS LIST | | |

 FERMION NATIONAL ACCELERATOR LABORATORY
UNITED STATES DEPARTMENT OF ENERGY

DESY 1.3GHZ TESLA
RF CAVITY
DUMBELL

| | | | |
|--|--------------------------------------|-----------------|-----|
| SCALE 1:2 | DRAWING NUMBER 4904.010-MC-439172 | SHEET 1 OF 1 | REV |
| CREATED WITH : Ideas11NXSeries GROUP: ACCELERATOR MECH. SUPPT. | | | |



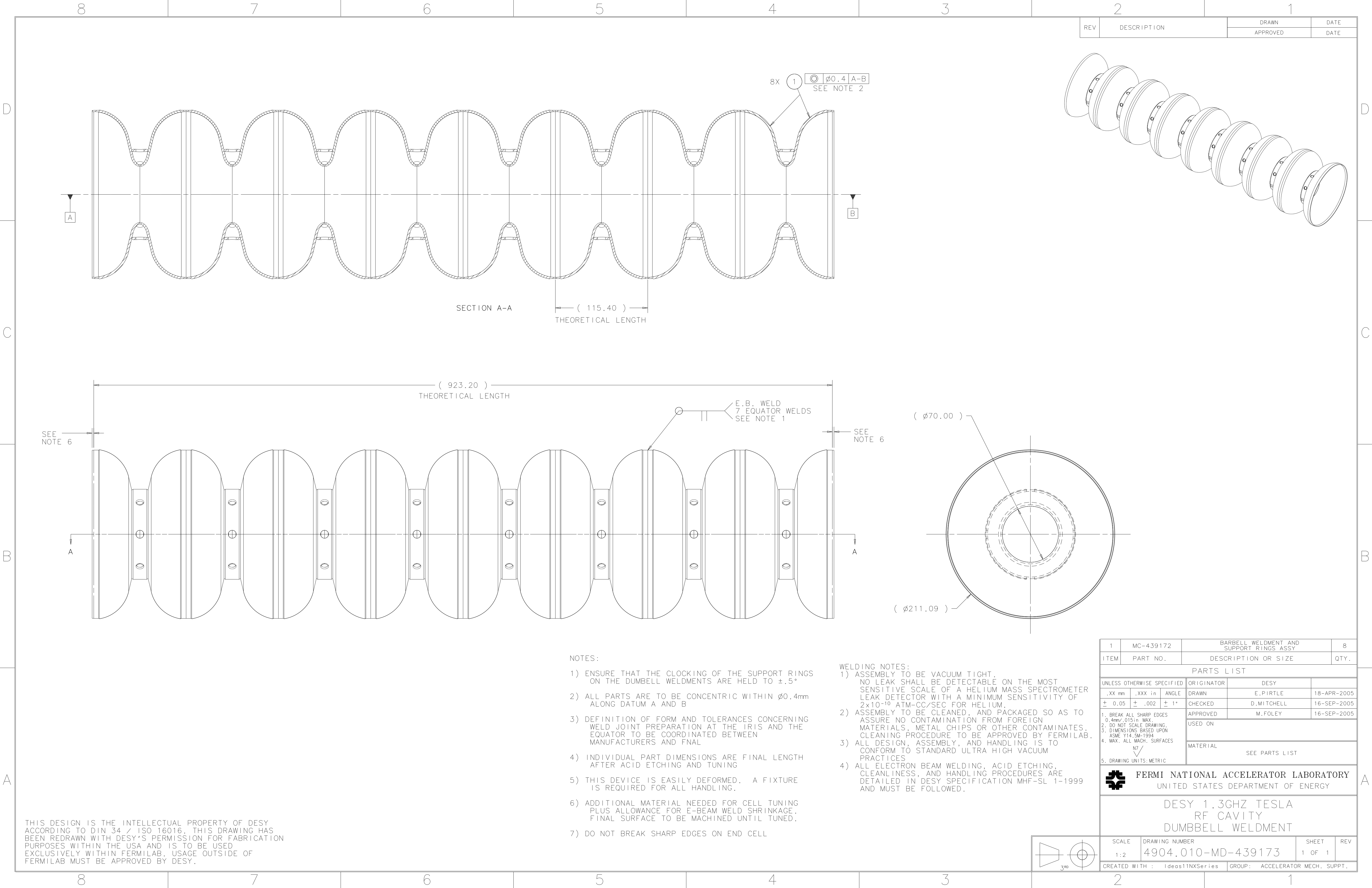
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4

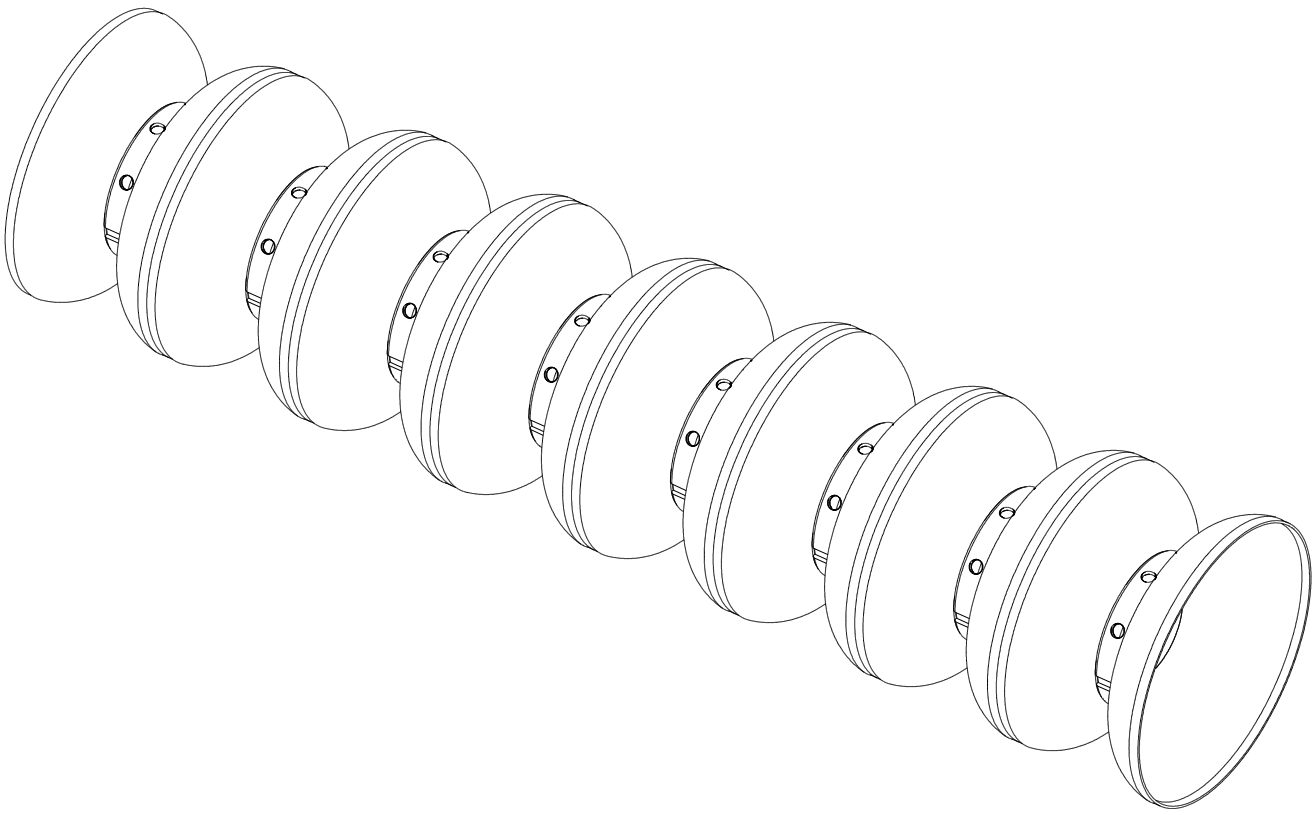
3

2

1



| REV | DESCRIPTION | DRAWN | DATE |
|-----|-------------|----------|------|
| | | APPROVED | DATE |



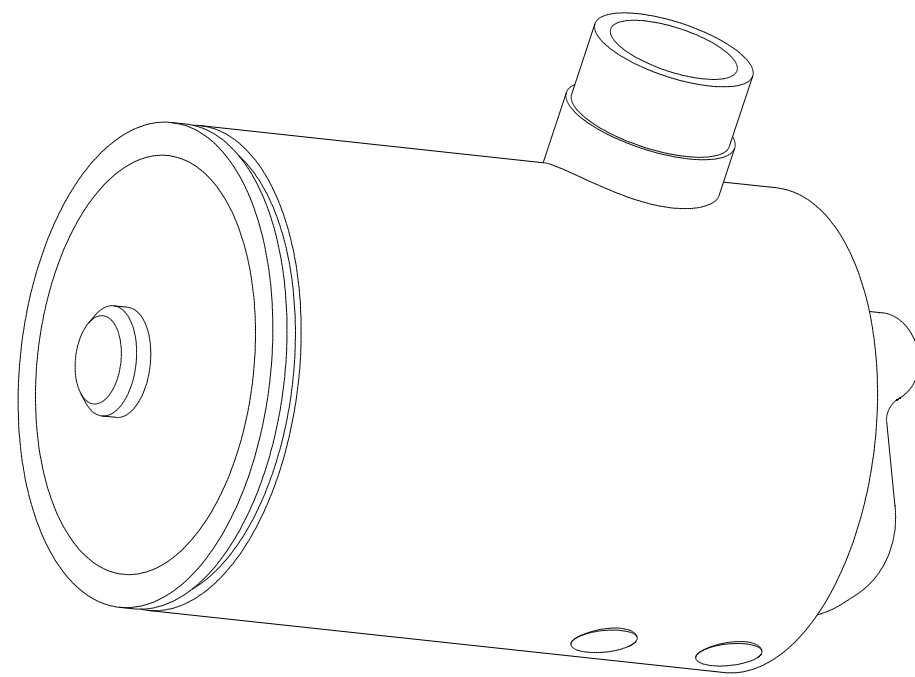
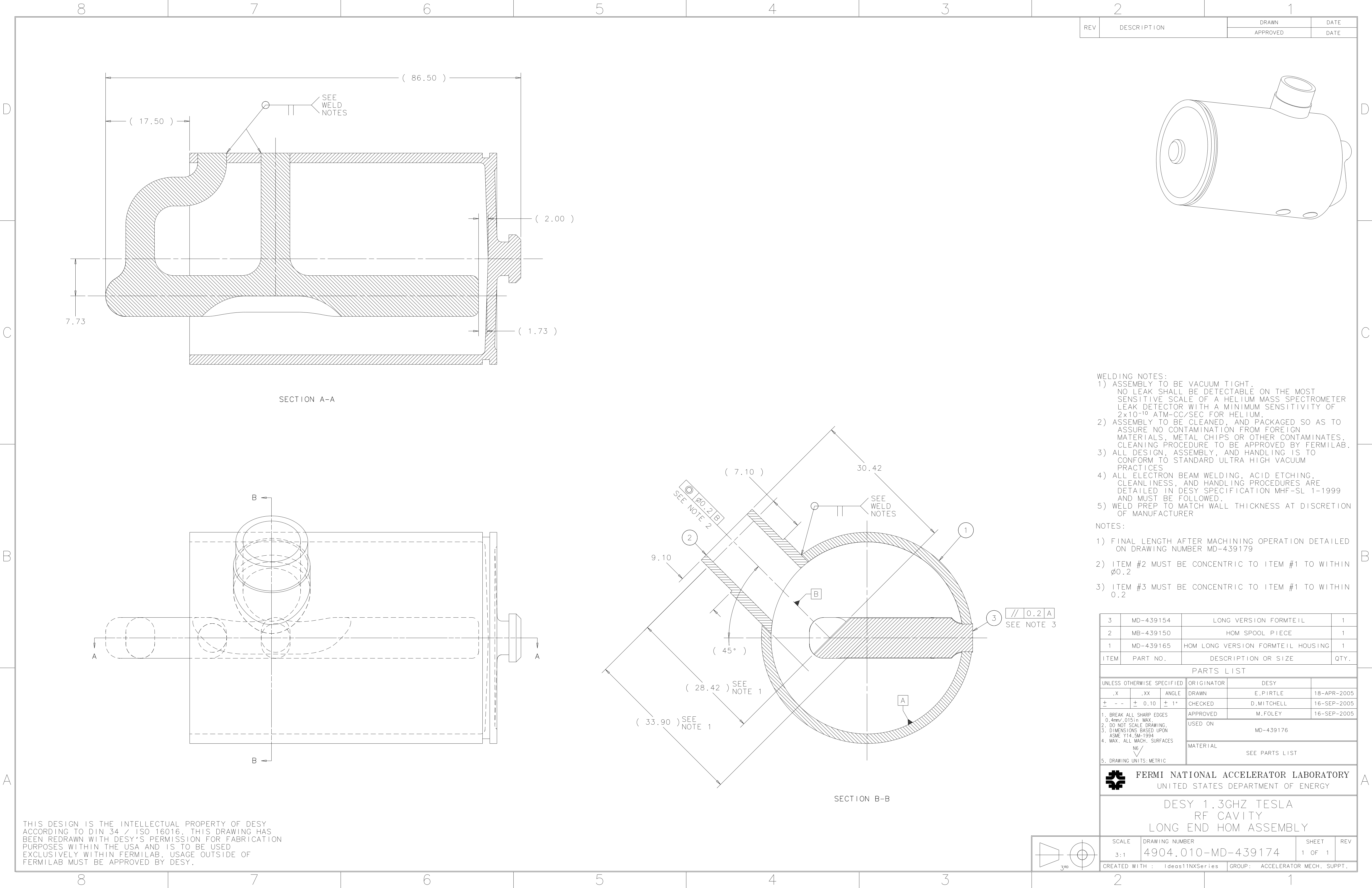
NOTES:

- ENSURE THAT THE CLOCKING OF THE SUPPORT RINGS ON THE DUMBELL WELDMENTS ARE HELD TO $\pm 5^\circ$
- ALL PARTS ARE TO BE CONCENTRIC WITHIN $\varnothing 0.4\text{mm}$ ALONG DATUM A AND B
- DEFINITION OF FORM AND TOLERANCES CONCERNING WELD JOINT PREPARATION AT THE IRIS AND THE EQUATOR TO BE COORDINATED BETWEEN MANUFACTURERS AND FNAL
- INDIVIDUAL PART DIMENSIONS ARE FINAL LENGTH AFTER ACID ETCHING AND TUNING
- THIS DEVICE IS EASILY DEFORMED. A FIXTURE IS REQUIRED FOR ALL HANDLING.
- ADDITIONAL MATERIAL NEEDED FOR CELL TUNING PLUS ALLOWANCE FOR E-BEAM WELD SHRINKAGE. FINAL SURFACE TO BE MACHINED UNTIL TUNED.
- DO NOT BREAK SHARP EDGES ON END CELL

WELDING NOTES:

- ASSEMBLY TO BE VACUUM TIGHT. NO LEAK SHALL BE DETECTABLE ON THE MOST SENSITIVE SCALE OF A HELIUM MASS SPECTROMETER LEAK DETECTOR WITH A MINIMUM SENSITIVITY OF 2×10^{-10} ATM-CC/SEC FOR HELIUM.
- ASSEMBLY TO BE CLEANED, AND PACKAGED SO AS TO ASSURE NO CONTAMINATION FROM FOREIGN MATERIALS, METAL CHIPS OR OTHER CONTAMINATES. CLEANING PROCEDURE TO BE APPROVED BY FERMILAB.
- ALL DESIGN, ASSEMBLY, AND HANDLING IS TO CONFORM TO STANDARD ULTRA HIGH VACUUM PRACTICES
- ALL ELECTRON BEAM WELDING, ACID ETCHING, CLEANLINESS, AND HANDLING PROCEDURES ARE DETAILED IN DESY SPECIFICATION MHF-SL 1-1999 AND MUST BE FOLLOWED.

| 1 | MC-439172 | BARBELL WELDMENT AND SUPPORT RINGS ASSY | 8 |
|---|--------------------------------------|---|----------------|
| ITEM | PART NO. | DESCRIPTION OR SIZE | QTY. |
| PARTS LIST | | | |
| UNLESS OTHERWISE SPECIFIED | | ORIGINATOR | DESY |
| .XX mm | .XXX in | ANGLE | DRAWN |
| ± 0.05 | $\pm .002$ | $\pm 1^\circ$ | CHECKED |
| 1. BREAK ALL SHARP EDGES 0.4mm/.015in MAX. 2. DO NOT SCALE DRAWING. 3. DIMENSIONS BASED UPON ASME Y14.5M-1994 4. MAX. ALL MACH. SURFACES N7 5. DRAWING UNITS: METRIC | | APPROVED | USED ON |
| | | MATERIAL | SEE PARTS LIST |
| FERMI NATIONAL ACCELERATOR LABORATORY UNITED STATES DEPARTMENT OF ENERGY | | | |
| DESY 1.3GHZ TESLA RF CAVITY DUMBELL WELDMENT | | | |
| SCALE 1:2 | DRAWING NUMBER 4904.010-MD-439173 | SHEET 1 OF 1 | REV |
| CREATED WITH : Ideos11NXSeries | | GROUP: ACCELERATOR MECH. SUPPT. | |



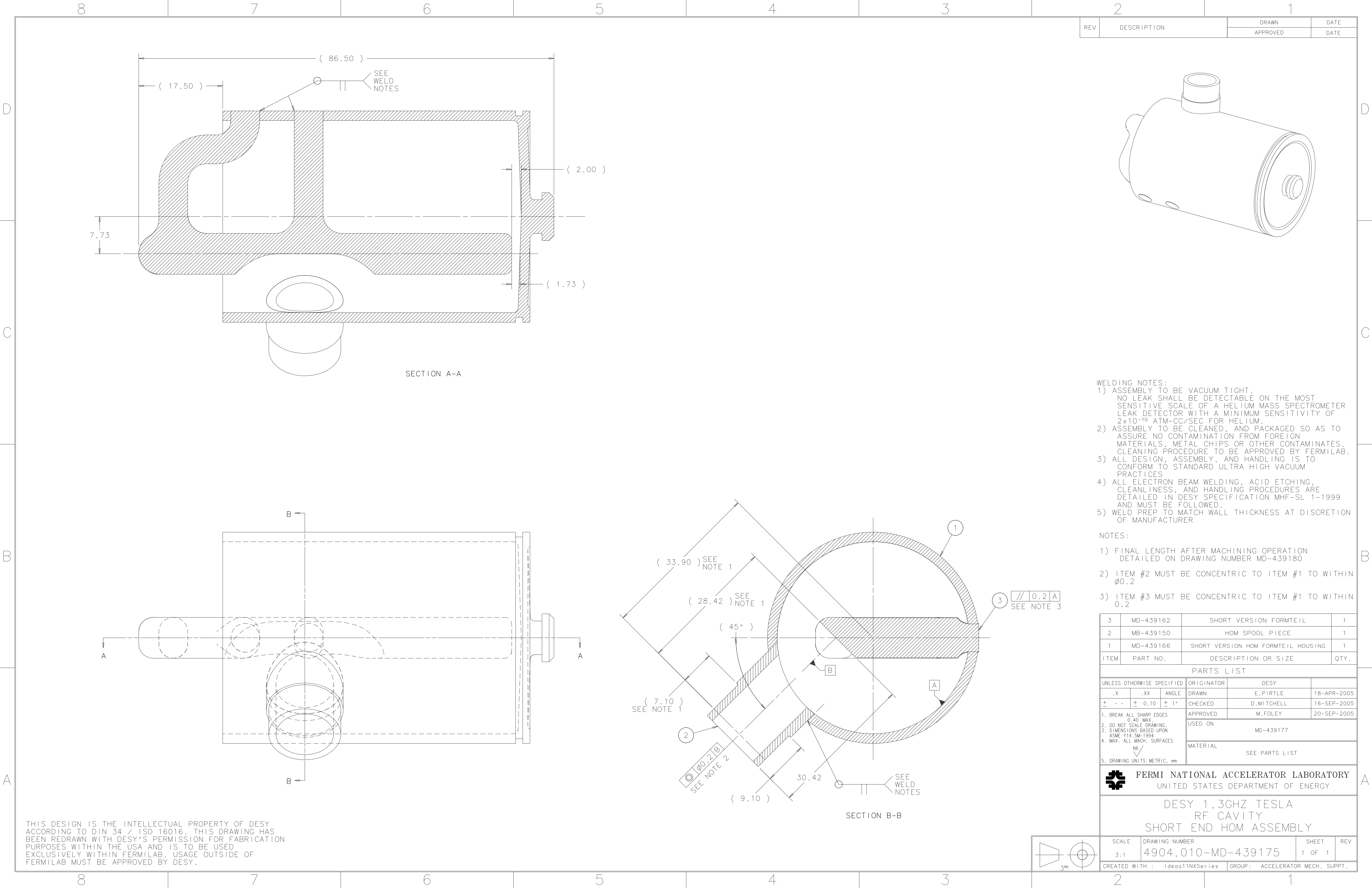
WELDING NOTES:

- 1) ASSEMBLY TO BE VACUUM TIGHT. NO LEAK SHALL BE DETECTABLE ON THE MOST SENSITIVE SCALE OF A HELIUM MASS SPECTROMETER LEAK DETECTOR WITH A MINIMUM SENSITIVITY OF 2×10^{-10} ATM-CC/SEC FOR HELIUM.
- 2) ASSEMBLY TO BE CLEANED, AND PACKAGED SO AS TO ASSURE NO CONTAMINATION FROM FOREIGN MATERIALS, METAL CHIPS OR OTHER CONTAMINATES. CLEANING PROCEDURE TO BE APPROVED BY FERMILAB.
- 3) ALL DESIGN, ASSEMBLY, AND HANDLING IS TO CONFORM TO STANDARD ULTRA HIGH VACUUM PRACTICES
- 4) ALL ELECTRON BEAM WELDING, ACID ETCHING, CLEANLINESS, AND HANDLING PROCEDURES ARE DETAILED IN DESY SPECIFICATION MHF-SL 1-1999 AND MUST BE FOLLOWED.
- 5) WELD PREP TO MATCH WALL THICKNESS AT DISCRETION OF MANUFACTURER

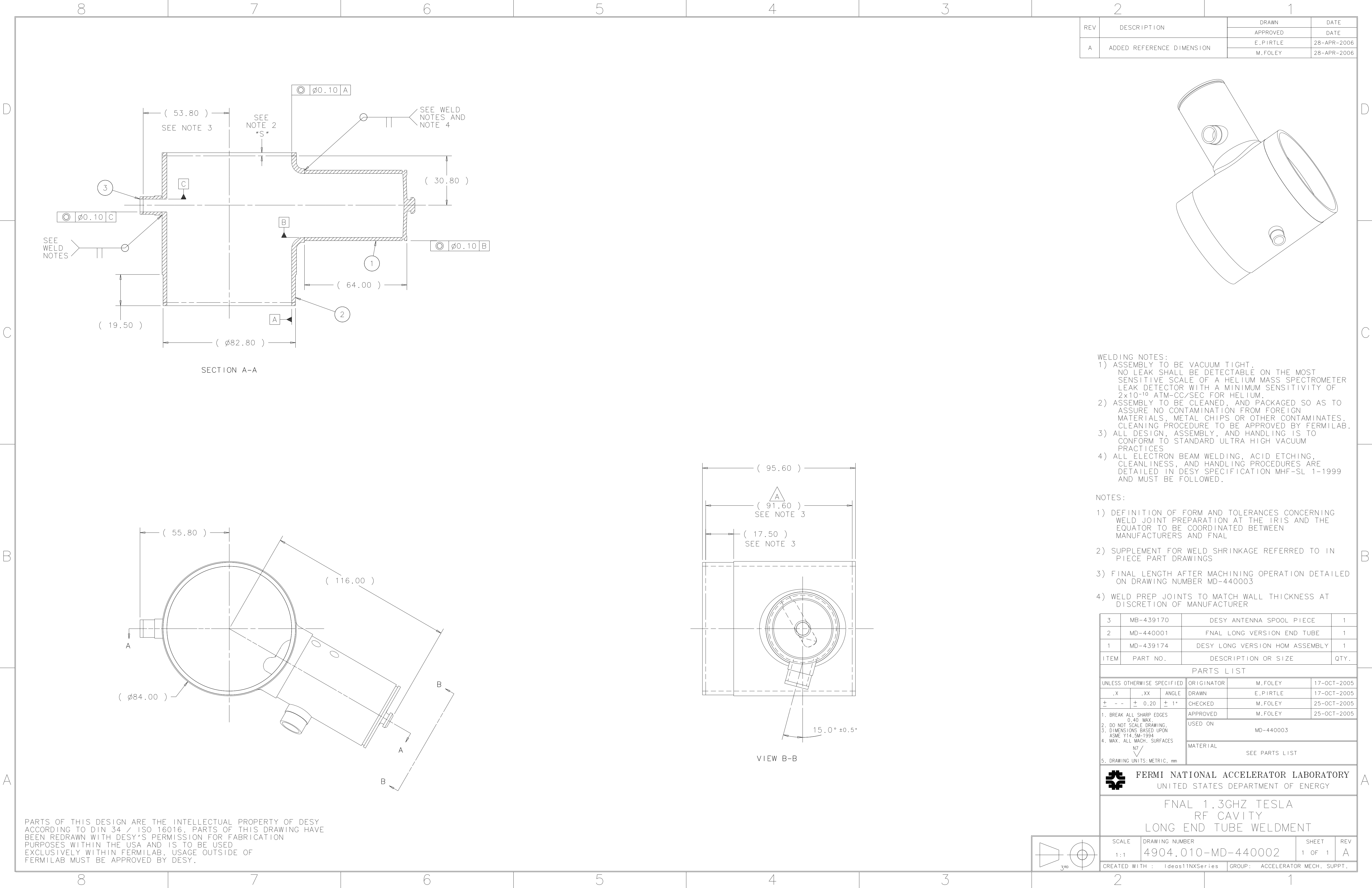
NOTES:

- 1) FINAL LENGTH AFTER MACHINING OPERATION DETAILED ON DRAWING NUMBER MD-439179
- 2) ITEM #2 MUST BE CONCENTRIC TO ITEM #1 TO WITHIN $\phi 0.2$
- 3) ITEM #3 MUST BE CONCENTRIC TO ITEM #1 TO WITHIN 0.2

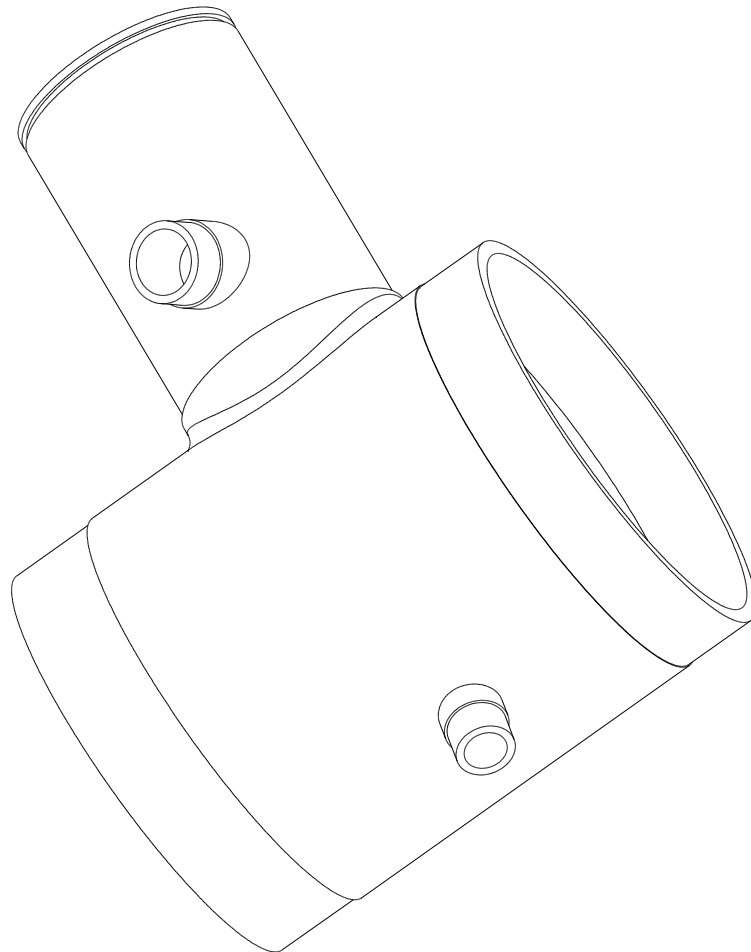
| | | | |
|---|--------------------|-----------------------------------|----------------|
| 3 | MD-439154 | LONG VERSION FORMTEIL | 1 |
| 2 | MB-439150 | HOM SPOOL PIECE | 1 |
| 1 | MD-439165 | HOM LONG VERSION FORMTEIL HOUSING | 1 |
| ITEM | PART NO. | DESCRIPTION OR SIZE | QTY. |
| PARTS LIST | | | |
| UNLESS OTHERWISE SPECIFIED | | ORIGINATOR | DESY |
| .X | .XX | DRAWN | E.PIRTLE |
| + | - | CHECKED | D.MITCHELL |
| 1. BREAK ALL SHARP EDGES 0.4mm/ 015in MAX. 2. DO NOT SCALE DRAWING. 3. DIMENSIONS BASED UPON ASME Y14.5M-1994 4. MAX. ALL MACH. SURFACES 5. DRAWING UNITS: METRIC | | APPROVED | M.FOLEY |
| | | USED ON | MD-439176 |
| | | MATERIAL | SEE PARTS LIST |
| FERMI NATIONAL ACCELERATOR LABORATORY UNITED STATES DEPARTMENT OF ENERGY | | | |
| DESY 1.3GHZ TESLA RF CAVITY LONG END HOM ASSEMBLY | | | |
| SCALE | DRAWING NUMBER | SHEET | REV |
| 3:1 | 4904.010-MD-439174 | 1 OF 1 | |
| CREATED WITH : Ideos11NXSeries | | GROUP: ACCELERATOR MECH. SUPPT. | |



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| REV | DESCRIPTION | DRAWN | DATE |
|-----|---------------------------|----------|-------------|
| | | APPROVED | DATE |
| A | ADDED REFERENCE DIMENSION | E.PIRTLE | 28-APR-2006 |
| | | M.FOLEY | 28-APR-2006 |



- WELDING NOTES:
- 1) ASSEMBLY TO BE VACUUM TIGHT. NO LEAK SHALL BE DETECTABLE ON THE MOST SENSITIVE SCALE OF A HELIUM MASS SPECTROMETER LEAK DETECTOR WITH A MINIMUM SENSITIVITY OF 2×10^{-10} ATM-CC/SEC FOR HELIUM.
 - 2) ASSEMBLY TO BE CLEANED, AND PACKAGED SO AS TO ASSURE NO CONTAMINATION FROM FOREIGN MATERIALS, METAL CHIPS OR OTHER CONTAMINATES. CLEANING PROCEDURE TO BE APPROVED BY FERMILAB.
 - 3) ALL DESIGN, ASSEMBLY, AND HANDLING IS TO CONFORM TO STANDARD ULTRA HIGH VACUUM PRACTICES
 - 4) ALL ELECTRON BEAM WELDING, ACID ETCHING, CLEANLINESS, AND HANDLING PROCEDURES ARE DETAILED IN DESY SPECIFICATION MHF-SL 1-1999 AND MUST BE FOLLOWED.

- NOTES:
- 1) DEFINITION OF FORM AND TOLERANCES CONCERNING WELD JOINT PREPARATION AT THE IRIS AND THE EQUATOR TO BE COORDINATED BETWEEN MANUFACTURERS AND FNAL
 - 2) SUPPLEMENT FOR WELD SHRINKAGE REFERRED TO IN PIECE PART DRAWINGS
 - 3) FINAL LENGTH AFTER MACHINING OPERATION DETAILED ON DRAWING NUMBER MD-440003
 - 4) WELD PREP JOINTS TO MATCH WALL THICKNESS AT DISCRETION OF MANUFACTURER

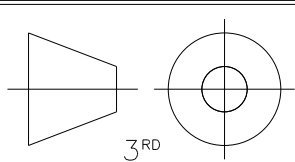
| 3 | MB-439170 | DESY ANTENNA SPOOL PIECE | 1 |
|------|-----------|--------------------------------|------|
| 2 | MD-440001 | FNAL LONG VERSION END TUBE | 1 |
| 1 | MD-439174 | DESY LONG VERSION HOM ASSEMBLY | 1 |
| ITEM | PART NO. | DESCRIPTION OR SIZE | QTY. |

| PARTS LIST | | | |
|---|----------------|---------|-----------------------------|
| UNLESS OTHERWISE SPECIFIED | ORIGINATOR | M.FOLEY | 17-OCT-2005 |
| .X | .XX | ANGLE | DRAWN E.PIRTLE 17-OCT-2005 |
| ± | - | ± 0.20 | CHECKED M.FOLEY 25-OCT-2005 |
| 1. BREAK ALL SHARP EDGES 0.40 MAX | APPROVED | M.FOLEY | 25-OCT-2005 |
| 2. DO NOT SCALE DRAWING. | USED ON | | |
| 3. DIMENSIONS BASED UPON ASME Y14.5M-1994 | MD-440003 | | |
| 4. MAX. ALL MACH. SURFACES | MATERIAL | | |
| 5. DRAWING UNITS: METRIC, mm | SEE PARTS LIST | | |



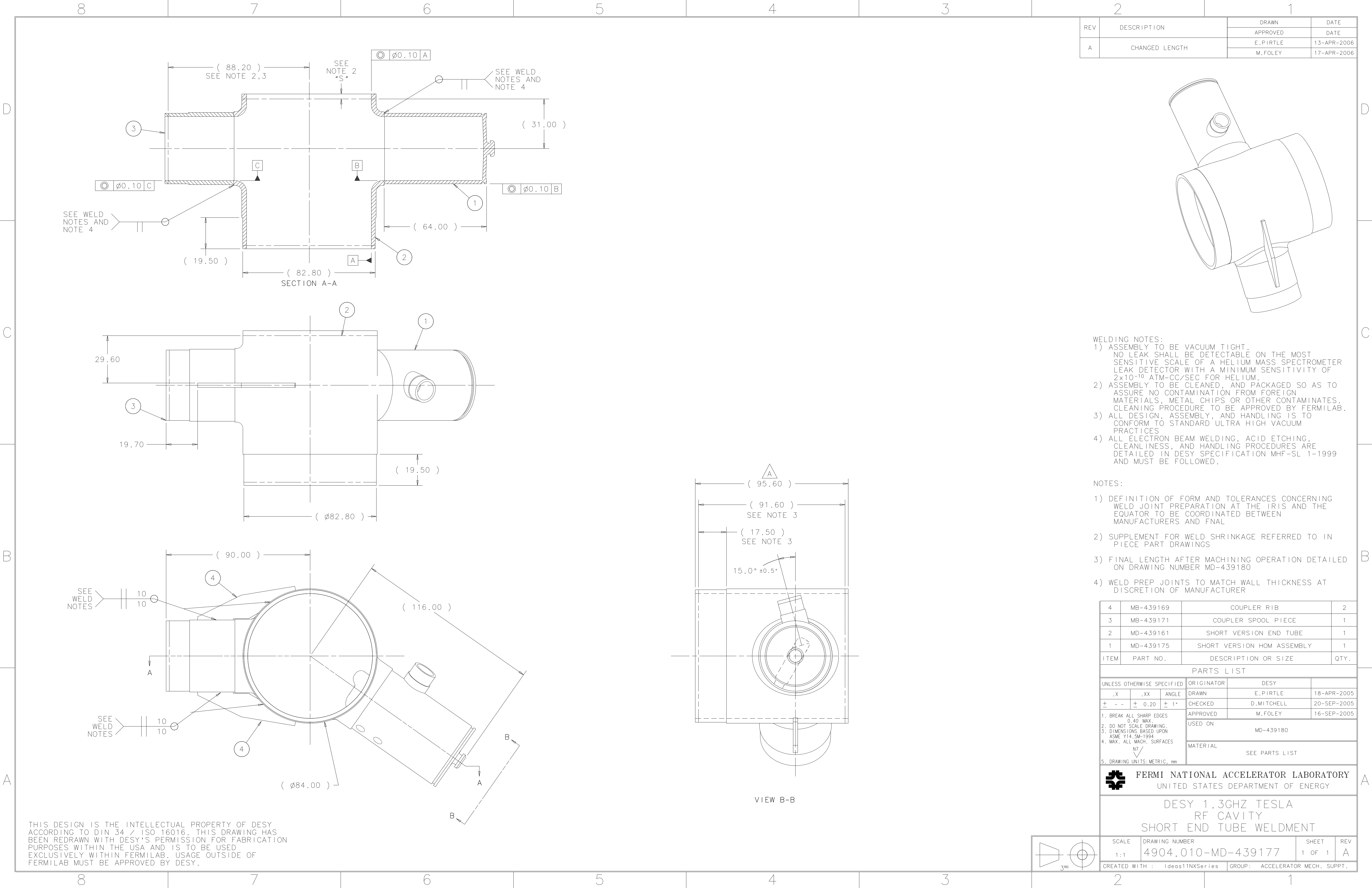
FERMI NATIONAL ACCELERATOR LABORATORY
UNITED STATES DEPARTMENT OF ENERGY

FNAL 1.3GHZ TESLA
RF CAVITY
LONG END TUBE WELDMENT



| SCALE | DRAWING NUMBER | SHEET | REV |
|--------------------------------|--------------------|---------------------------------|-----|
| 1:1 | 4904.010-MD-440002 | 1 OF 1 | A |
| CREATED WITH : Ideos11NXSeries | | GROUP: ACCELERATOR MECH. SUPPT. | |

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EXCLUSIVELY WITHIN FERMILAB. USAGE OUTSIDE OF
FERMILAB MUST BE APPROVED BY DESY.



| REV | DESCRIPTION | DRAWN | DATE |
|-----|----------------|------------|-------------|
| | | APPROVED | DATE |
| A | CHANGED LENGTH | E. PIRTLER | 13-APR-2006 |
| | | M. FOLEY | 17-APR-2006 |

WELDING NOTES:

- 1) ASSEMBLY TO BE VACUUM TIGHT. NO LEAK SHALL BE DETECTABLE ON THE MOST SENSITIVE SCALE OF A HELIUM MASS SPECTROMETER LEAK DETECTOR WITH A MINIMUM SENSITIVITY OF 2×10^{-10} ATM-CC/SEC FOR HELIUM.
- 2) ASSEMBLY TO BE CLEANED, AND PACKAGED SO AS TO ASSURE NO CONTAMINATION FROM FOREIGN MATERIALS, METAL CHIPS OR OTHER CONTAMINATES. CLEANING PROCEDURE TO BE APPROVED BY FERMILAB.
- 3) ALL DESIGN, ASSEMBLY, AND HANDLING IS TO CONFORM TO STANDARD ULTRA HIGH VACUUM PRACTICES
- 4) ALL ELECTRON BEAM WELDING, ACID ETCHING, CLEANLINESS, AND HANDLING PROCEDURES ARE DETAILED IN DESY SPECIFICATION MHF-SL 1-1999 AND MUST BE FOLLOWED.

NOTES:

- 1) DEFINITION OF FORM AND TOLERANCES CONCERNING WELD JOINT PREPARATION AT THE IRIS AND THE EQUATOR TO BE COORDINATED BETWEEN MANUFACTURERS AND FNAL
- 2) SUPPLEMENT FOR WELD SHRINKAGE REFERRED TO IN PIECE PART DRAWINGS
- 3) FINAL LENGTH AFTER MACHINING OPERATION DETAILED ON DRAWING NUMBER MD-439180
- 4) WELD PREP JOINTS TO MATCH WALL THICKNESS AT DISCRETION OF MANUFACTURER

| | | | |
|------|-----------|----------------------------|------|
| 4 | MB-439169 | COUPLER RIB | 2 |
| 3 | MB-439171 | COUPLER SPOOL PIECE | 1 |
| 2 | MD-439161 | SHORT VERSION END TUBE | 1 |
| 1 | MD-439175 | SHORT VERSION HOM ASSEMBLY | 1 |
| ITEM | PART NO. | DESCRIPTION OR SIZE | QTY. |

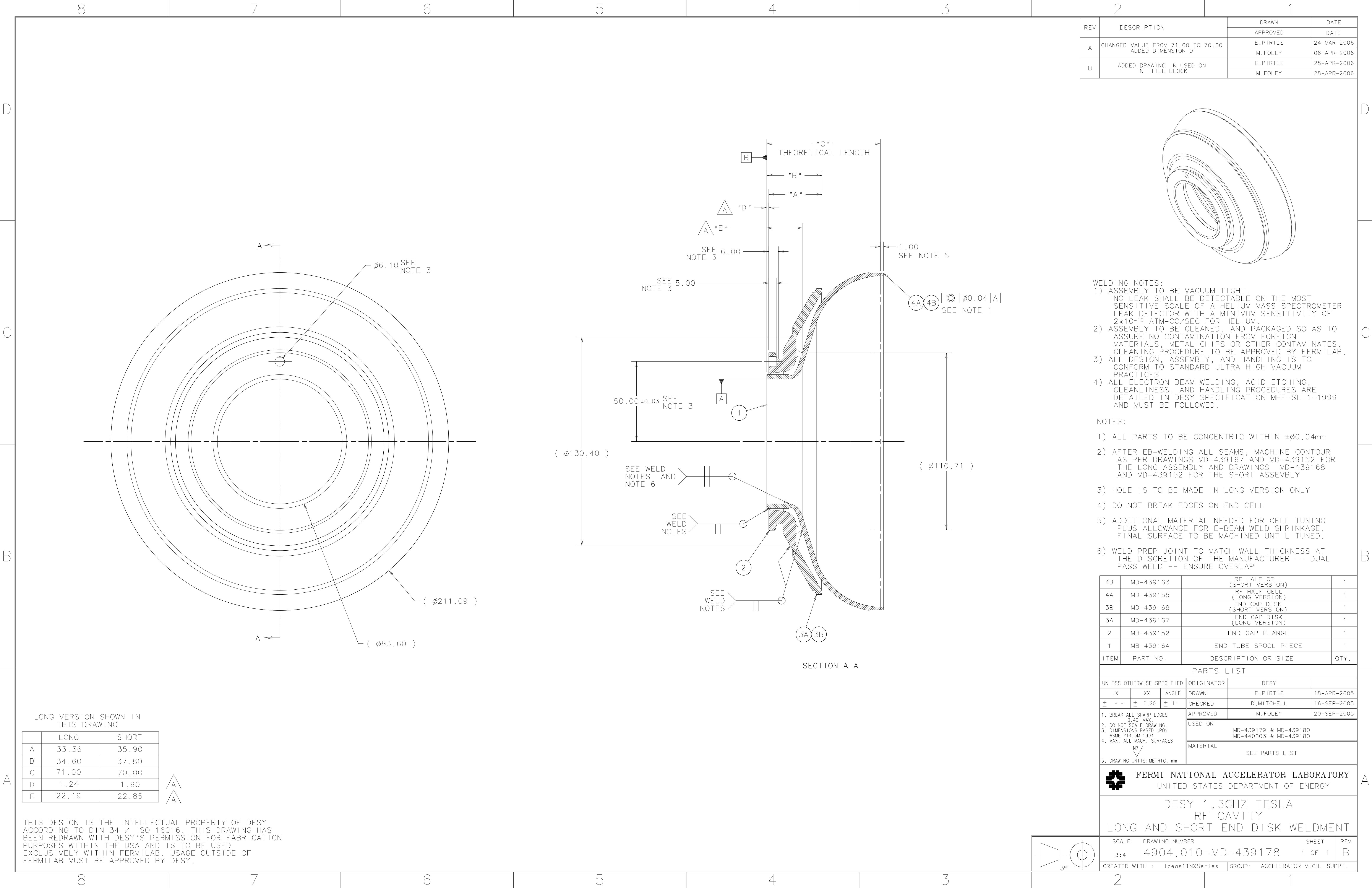
| PARTS LIST | | | |
|---|-----|----------------|-------------|
| UNLESS OTHERWISE SPECIFIED | | ORIGINATOR | DESY |
| .X | .XX | DRAWN | E. PIRTLER |
| ± | ± | CHECKED | D. MITCHELL |
| 1. BREAK ALL SHARP EDGES 0.40 MAX | | APPROVED | M. FOLEY |
| 2. DO NOT SCALE DRAWING | | USED ON | |
| 3. DIMENSIONS BASED UPON ASME Y14.5M-1994 | | MD-439180 | |
| 4. MAX. ALL MACH. SURFACES | | MATERIAL | |
| 5. DRAWING UNITS: METRIC, mm | | SEE PARTS LIST | |

FERMI NATIONAL ACCELERATOR LABORATORY
UNITED STATES DEPARTMENT OF ENERGY

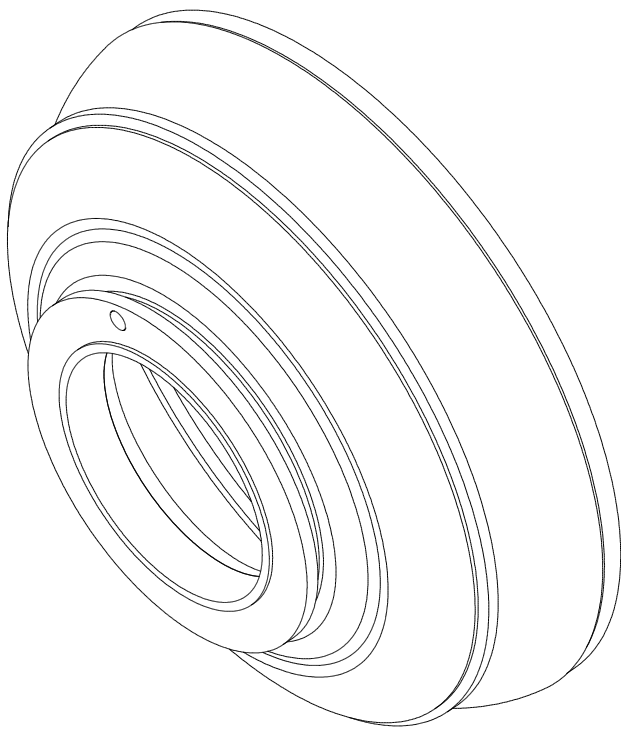
DESIGN 1.3GHZ TESLA
RF CAVITY
SHORT END TUBE WELDMENT

| | | | |
|--------------------------------|--------------------|---------------------------------|-----|
| SCALE | DRAWING NUMBER | SHEET | REV |
| 1:1 | 4904.010-MD-439177 | 1 OF 1 | A |
| CREATED WITH : Ideos11NXSeries | | GROUP: ACCELERATOR MECH. SUPPT. | |

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ACCORDING TO DIN 34 / ISO 16016. THIS DRAWING HAS
BEEN REDRAWN WITH DESY'S PERMISSION FOR FABRICATION
PURPOSES WITHIN THE USA AND IS TO BE USED
EXCLUSIVELY WITHIN FERMILAB. USAGE OUTSIDE OF
FERMILAB MUST BE APPROVED BY DESY.



| REV | DESCRIPTION | DRAWN | DATE |
|-----|--|----------|-------------|
| | | APPROVED | DATE |
| A | CHANGED VALUE FROM 71.00 TO 70.00 ADDED DIMENSION D | E.PIRTLE | 24-MAR-2006 |
| | | M.FOLEY | 06-APR-2006 |
| B | ADDED DRAWING IN USED ON IN TITLE BLOCK | E.PIRTLE | 28-APR-2006 |
| | | M.FOLEY | 28-APR-2006 |




- WELDING NOTES:
- 1) ASSEMBLY TO BE VACUUM TIGHT.
NO LEAK SHALL BE DETECTABLE ON THE MOST SENSITIVE SCALE OF A HELIUM MASS SPECTROMETER LEAK DETECTOR WITH A MINIMUM SENSITIVITY OF 2×10^{-10} ATM-CC/SEC FOR HELIUM.
 - 2) ASSEMBLY TO BE CLEANED, AND PACKAGED SO AS TO ASSURE NO CONTAMINATION FROM FOREIGN MATERIALS, METAL CHIPS OR OTHER CONTAMINATES. CLEANING PROCEDURE TO BE APPROVED BY FERMILAB.
 - 3) ALL DESIGN, ASSEMBLY, AND HANDLING IS TO CONFORM TO STANDARD ULTRA HIGH VACUUM PRACTICES
 - 4) ALL ELECTRON BEAM WELDING, ACID ETCHING, CLEANLINESS, AND HANDLING PROCEDURES ARE DETAILED IN DESY SPECIFICATION MHF-SL 1-1999 AND MUST BE FOLLOWED.

- NOTES:
- 1) ALL PARTS TO BE CONCENTRIC WITHIN $\pm \phi 0.04\text{mm}$
 - 2) AFTER EB-WELDING ALL SEAMS, MACHINE CONTOUR AS PER DRAWINGS MD-439167 AND MD-439152 FOR THE LONG ASSEMBLY AND DRAWINGS MD-439168 AND MD-439152 FOR THE SHORT ASSEMBLY
 - 3) HOLE IS TO BE MADE IN LONG VERSION ONLY
 - 4) DO NOT BREAK EDGES ON END CELL
 - 5) ADDITIONAL MATERIAL NEEDED FOR CELL TUNING PLUS ALLOWANCE FOR E-BEAM WELD SHRINKAGE. FINAL SURFACE TO BE MACHINED UNTIL TUNED.
 - 6) WELD PREP JOINT TO MATCH WALL THICKNESS AT THE DISCRETION OF THE MANUFACTURER -- DUAL PASS WELD -- ENSURE OVERLAP

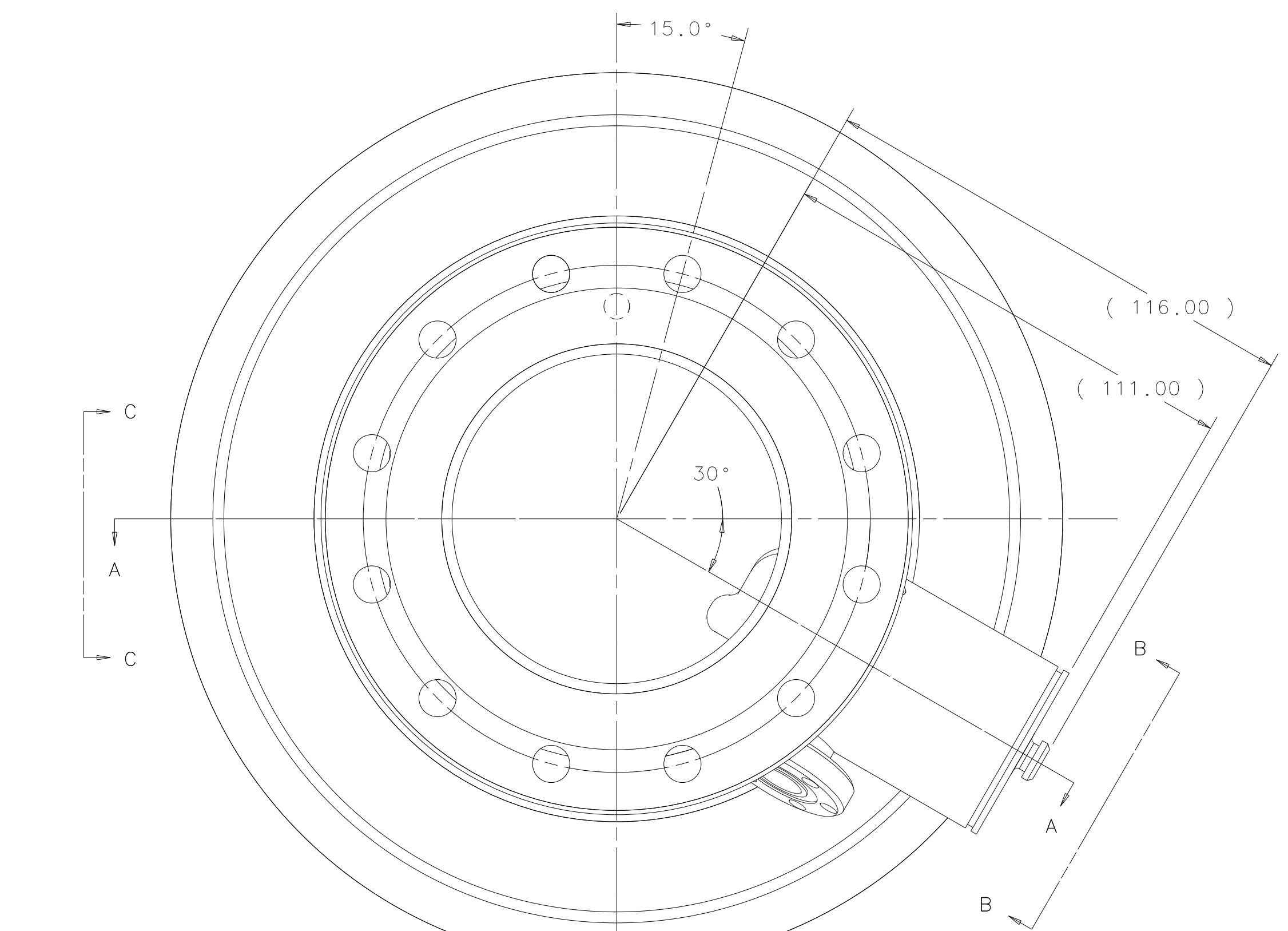
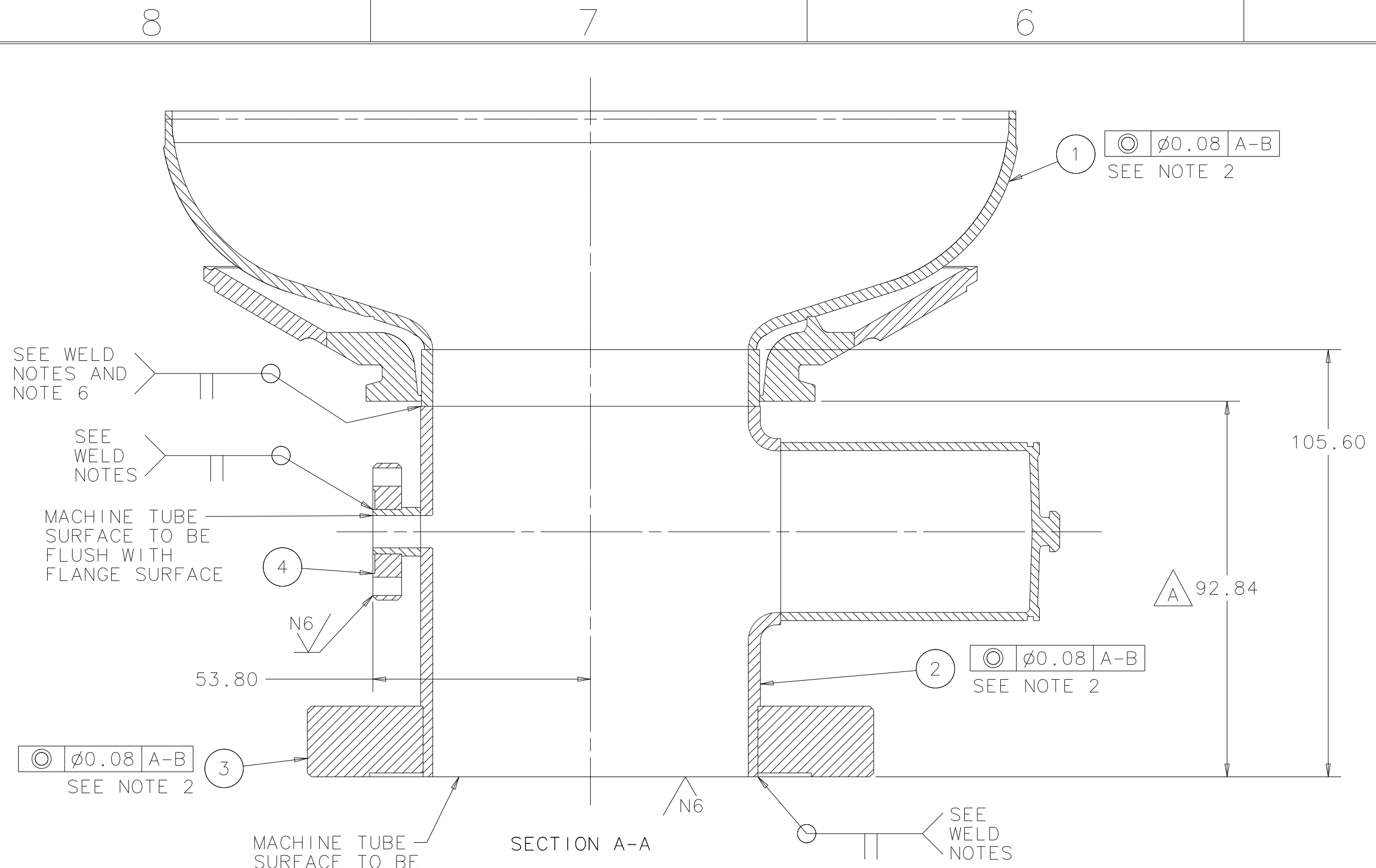
| | | | |
|------|-----------|------------------------------|------|
| 4B | MD-439163 | RF HALF CELL (SHORT VERSION) | 1 |
| 4A | MD-439155 | RF HALF CELL (LONG VERSION) | 1 |
| 3B | MD-439168 | END CAP DISK (SHORT VERSION) | 1 |
| 3A | MD-439167 | END CAP DISK (LONG VERSION) | 1 |
| 2 | MD-439152 | END CAP FLANGE | 1 |
| 1 | MB-439164 | END TUBE SPOOL PIECE | 1 |
| ITEM | PART NO. | DESCRIPTION OR SIZE | QTY. |

PARTS LIST

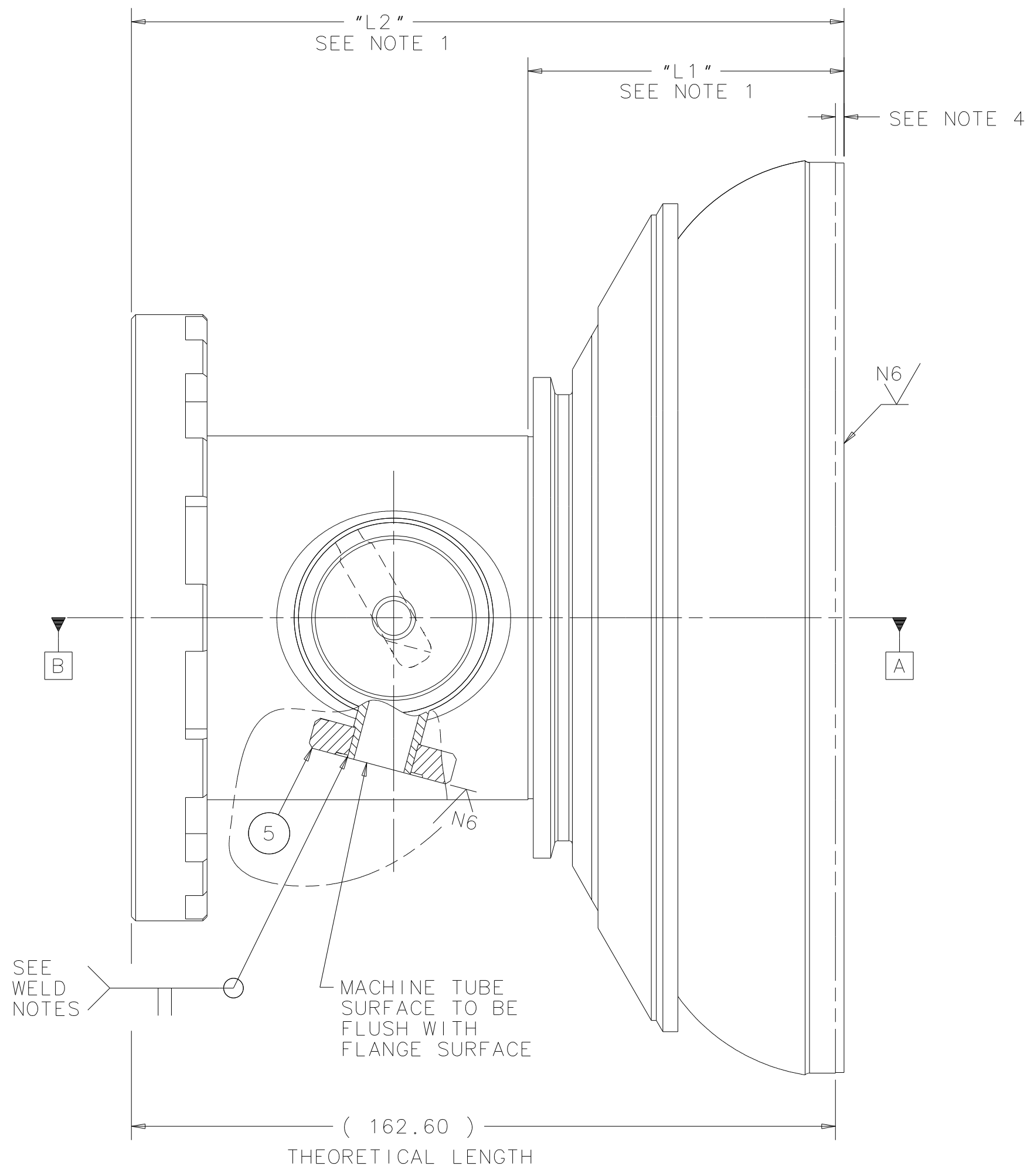
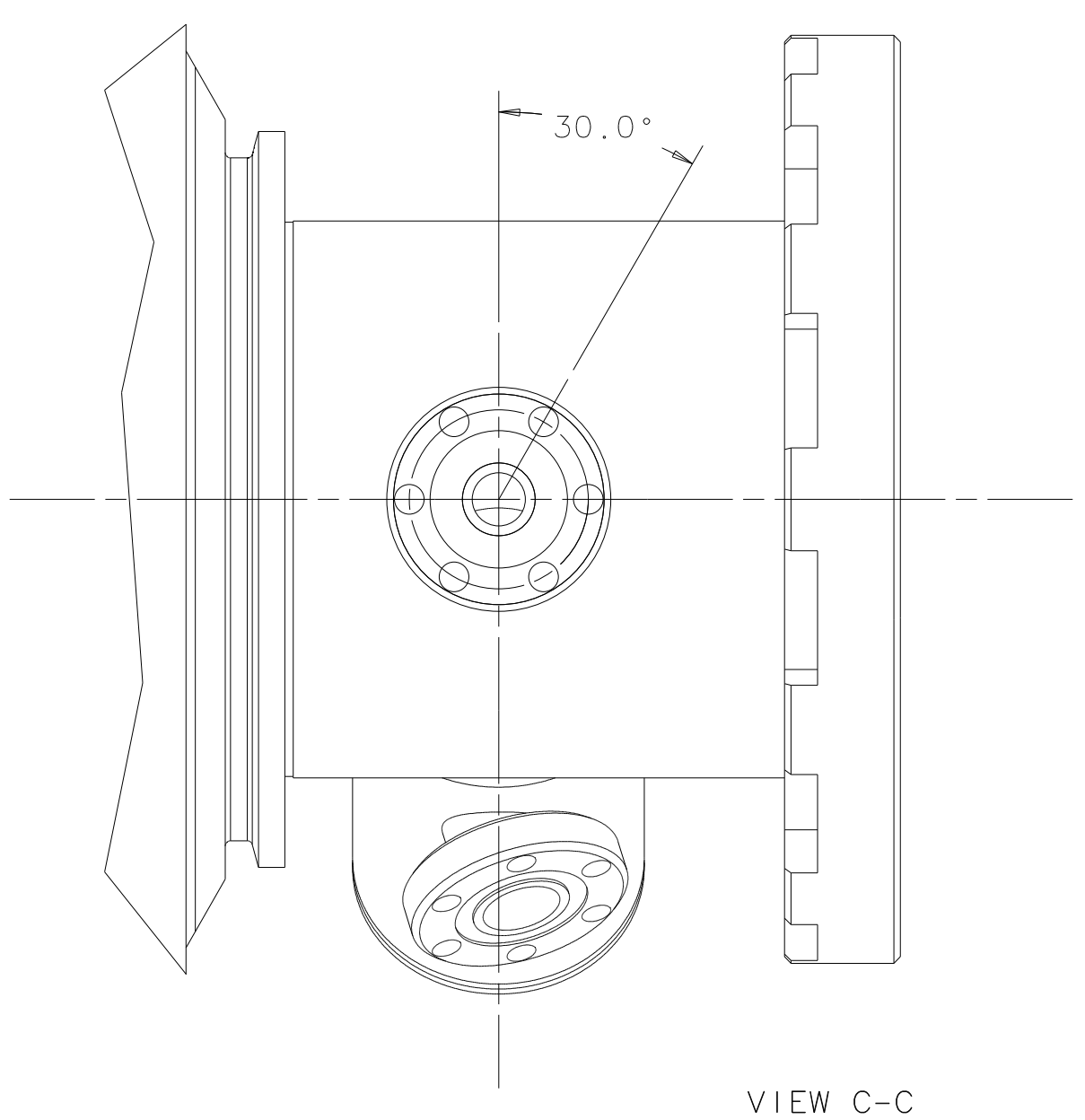
| UNLESS OTHERWISE SPECIFIED | | | ORIGINATOR | DESY | |
|--|-----|--------|--|------------|-------------|
| .X | .XX | ANGLE | DRAWN | E.PIRTLE | 18-APR-2005 |
| ± | - | ± 0.20 | CHECKED | D.MITCHELL | 16-SEP-2005 |
| 1. BREAK ALL SHARP EDGES 0.40 MAX 2. DO NOT SCALE DRAWING. 3. DIMENSIONS BASED UPON ASME Y14.5M-1994 4. MAX. ALL MACH. SURFACES | | | APPROVED | M.FOLEY | 20-SEP-2005 |
| <div>N7</div> 5. DRAWING UNITS: METRIC, mm | | | USED ON | | |
| | | | MD-439179 & MD-439180 MD-440003 & MD-439180 | | |
| | | | MATERIAL | | |
| | | | SEE PARTS LIST | | |

| | | | | |
|---|---|---------------------------------|-----------------|----------|
|  | FERMI NATIONAL ACCELERATOR LABORATORY UNITED STATES DEPARTMENT OF ENERGY | | | |
| DESY 1.3GHZ TESLA RF CAVITY LONG AND SHORT END DISK WELDMENT | | | | |
| SCALE 3:4 | DRAWING NUMBER 4904.010-MD-439178 | | SHEET 1 OF 1 | REV B |
| CREATED WITH : Ideos11NXSeries | | GROUP: ACCELERATOR MECH. SUPPT. | | |

D
C
B
A



PARTS OF THIS DESIGN ARE THE INTELLECTUAL PROPERTY OF DESY
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FERMILAB MUST BE APPROVED BY DESY.



| REV | DESCRIPTION | DRAWN | DATE |
|-----|----------------|----------|-------------|
| | | APPROVED | DATE |
| A | CHANGED LENGTH | E.PIRTLE | 28-APR-2006 |
| | | M.FOLEY | 28-APR-2006 |




- WELDING NOTES:
- 1) ASSEMBLY TO BE VACUUM TIGHT.
NO LEAK SHALL BE DETECTABLE ON THE MOST SENSITIVE SCALE OF A HELIUM MASS SPECTROMETER LEAK DETECTOR WITH A MINIMUM SENSITIVITY OF 2×10^{-10} ATM-CC/SEC FOR HELIUM.
 - 2) ASSEMBLY TO BE CLEANED, AND PACKAGED SO AS TO ASSURE NO CONTAMINATION FROM FOREIGN MATERIALS, METAL CHIPS OR OTHER CONTAMINATES. CLEANING PROCEDURE TO BE APPROVED BY FERMILAB.
 - 3) ALL DESIGN, ASSEMBLY, AND HANDLING IS TO CONFORM TO STANDARD ULTRA HIGH VACUUM PRACTICES
 - 4) ALL ELECTRON BEAM WELDING, ACID ETCHING, CLEANLINESS, AND HANDLING PROCEDURES ARE DETAILED IN DESY SPECIFICATION MHF-SL 1-1999 AND MUST BE FOLLOWED.

- NOTES:
- 1) DIMENSIONS L1 AND L2 ARE DEPENDENT ON A FREQUENCY MEASUREMENT. HALF CELL EQUATOR IS TO BE FINISHED TO FNAL SPECIFICATIONS RELATED TO SAID MEASUREMENT ALLOWING ADDITIONAL MATERIAL FOR WELD SHRINKAGE "S".
 - 2) ITEMS 1, 2, AND 3 ARE TO BE CONCENTRIC WITHIN Ø0.08MM ALONG DATUM A AND B
 - 3) SEALING SURFACE MUST BE FREE OF SCRATCHES WITH NO RADIAL SCORING. SURFACE MUST BE FREE OF DAMAGES.
 - 4) ADDITIONAL MATERIAL NEEDED FOR CELL TUNING PLUS ALLOWANCE FOR E-BEAM WELD SHRINKAGE. FINAL SURFACE TO BE MACHINED UNTIL TUNED.
 - 5) DO NOT BREAK EDGES ON END CELL
 - 6) DUAL PASS WELD -- ENSURE OVERLAP

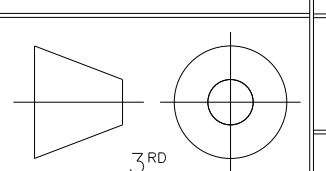
| 5 | MB-439157 | DESY NW12 HOM FLANGE | 1 |
|------|-----------|--|------|
| 4 | MB-439160 | DESY NW8 ANTENNA FLANGE | 1 |
| 3 | MD-439159 | DESY NW78 BEAM FLANGE | 1 |
| 2 | MD-440002 | FNAL END TUBE WELDMENT (LONG VERSION) | 1 |
| 1 | MD-439178 | DESY END DISK FLANGE WELDMENT (LONG VERSION) | 1 |
| ITEM | PART NO. | DESCRIPTION OR SIZE | QTY. |

| PARTS LIST | | | | |
|--|--|--------------------------------|----------|-------------|
| UNLESS OTHERWISE SPECIFIED | | ORIGINATOR | M.FOLEY | 17-OCT-2005 |
| .X | | DRAWN | E.PIRTLE | 17-OCT-2005 |
| + - - ± 0.20 ± 0.5° | | CHECKED | M.FOLEY | 25-OCT-2005 |
| 1. BREAK ALL SHARP EDGES 0.40 MAX. | | APPROVED | M.FOLEY | 25-OCT-2005 |
| 2. DO NOT SCALE DRAWING. | | USED ON MD-440004 | | |
| 3. DIMENSIONS BASED UPON ASME Y14.5M-1994 | | | | |
| 4. MAX. ALL MACH. SURFACES | | MATERIAL SEE PARTS LIST | | |
| 5. DRAWING UNITS: METRIC, mm | | | | |

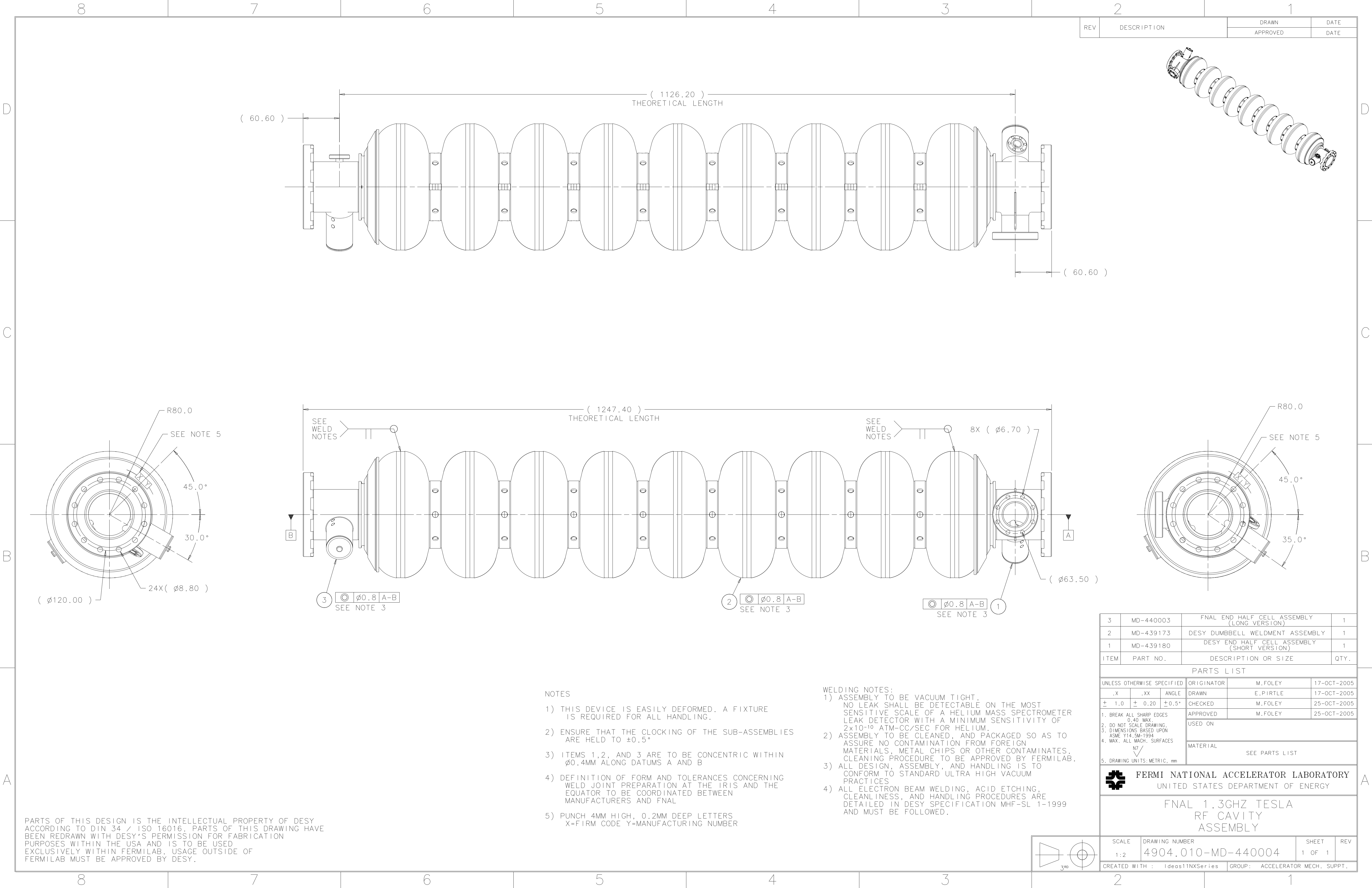
**FERMI NATIONAL ACCELERATOR LABORATORY**
UNITED STATES DEPARTMENT OF ENERGY

FNAL 1.3GHZ TESLA
RF CAVITY
LONG END HALF CELL ASSEMBLY

| | | | |
|--------------------------------|--------------------------------------|---------------------------------|----------|
| SCALE 1:1 | DRAWING NUMBER 4904.010-MD-440003 | SHEET 1 OF 1 | REV A |
| CREATED WITH : Ideos11NXSeries | | GROUP: ACCELERATOR MECH. SUPPT. | |



D
C
B
A



PARTS OF THIS DESIGN IS THE INTELLECTUAL PROPERTY OF DESY
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FERMILAB MUST BE APPROVED BY DESY.

NOTES

- 1) THIS DEVICE IS EASILY DEFORMED. A FIXTURE IS REQUIRED FOR ALL HANDLING.
- 2) ENSURE THAT THE CLOCKING OF THE SUB-ASSEMBLIES ARE HELD TO $\pm 0.5^\circ$
- 3) ITEMS 1, 2, AND 3 ARE TO BE CONCENTRIC WITHIN $\phi 0.4\text{MM}$ ALONG DATUMS A AND B
- 4) DEFINITION OF FORM AND TOLERANCES CONCERNING WELD JOINT PREPARATION AT THE IRIS AND THE EQUATOR TO BE COORDINATED BETWEEN MANUFACTURERS AND FNAL
- 5) PUNCH 4MM HIGH, 0.2MM DEEP LETTERS
X=FIRM CODE Y=MANUFACTURING NUMBER

WELDING NOTES:

- 1) ASSEMBLY TO BE VACUUM TIGHT.
NO LEAK SHALL BE DETECTABLE ON THE MOST SENSITIVE SCALE OF A HELIUM MASS SPECTROMETER LEAK DETECTOR WITH A MINIMUM SENSITIVITY OF 2×10^{-10} ATM-CC/SEC FOR HELIUM.
- 2) ASSEMBLY TO BE CLEANED, AND PACKAGED SO AS TO ASSURE NO CONTAMINATION FROM FOREIGN MATERIALS, METAL CHIPS OR OTHER CONTAMINATES. CLEANING PROCEDURE TO BE APPROVED BY FERMILAB.
- 3) ALL DESIGN, ASSEMBLY, AND HANDLING IS TO CONFORM TO STANDARD ULTRA HIGH VACUUM PRACTICES
- 4) ALL ELECTRON BEAM WELDING, ACID ETCHING, CLEANLINESS, AND HANDLING PROCEDURES ARE DETAILED IN DESY SPECIFICATION MHF-SL 1-1999 AND MUST BE FOLLOWED.

| | | | |
|------|-----------|---|------|
| 3 | MD-440003 | FNAL END HALF CELL ASSEMBLY (LONG VERSION) | 1 |
| 2 | MD-439173 | DESY DUMBBELL WELDMENT ASSEMBLY | 1 |
| 1 | MD-439180 | DESY END HALF CELL ASSEMBLY (SHORT VERSION) | 1 |
| ITEM | PART NO. | DESCRIPTION OR SIZE | QTY. |

PARTS LIST

| | | | |
|---|----------------|---------|-------------|
| UNLESS OTHERWISE SPECIFIED | ORIGINATOR | M.FOLEY | 17-OCT-2005 |
| .X | .XX | ANGLE | E.PIRTLE |
| ± 1.0 | ± 0.20 | ± 0.5° | 25-OCT-2005 |
| 1. BREAK ALL SHARP EDGES 0.40 MAX | CHECKED | M.FOLEY | 25-OCT-2005 |
| 2. DO NOT SCALE DRAWING. | APPROVED | M.FOLEY | 25-OCT-2005 |
| 3. DIMENSIONS BASED UPON ASME Y14.5M-1994 | USED ON | | |
| 4. MAX. ALL MACH. SURFACES | MATERIAL | | |
| 5. DRAWING UNITS: METRIC, mm | SEE PARTS LIST | | |

FERMI NATIONAL ACCELERATOR LABORATORY
UNITED STATES DEPARTMENT OF ENERGY

FNAL 1.3GHZ TESLA
RF CAVITY
ASSEMBLY

| | | | |
|--------------------------------|--------------------|---------------------------------|-----|
| SCALE | DRAWING NUMBER | SHEET | REV |
| 1:2 | 4904.010-MD-440004 | 1 OF 1 | |
| CREATED WITH : Ideos11NXSeries | | GROUP: ACCELERATOR MECH. SUPPT. | |